CROWOOD AVIATION SERIES

Douglas A-26 and B-26 INVADER



Scott Thompson

CROWOOD AVIATION SERIES

Douglas A-26 and B-26 INVADER

Scott Thompson

The Crowood Press

First published in 2002 by
The Crowood Press Ltd
Ramsbury, Marlborough
Wiltshire SN8 2HR

© Scott Thompson 2002

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publishers.

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library.

ISBN 1 86126 503 4

Dedication

This book is respectfully dedicated to the late Malcom L. Gougon, an unsung aviation historian whose meticulous research and helpful assistance were freely given to anyone who asked.

Acknowledgements

Special thanks to Nicholas A. Veronico for his editing and encouragement; to Patricia M. McGinnis of the Boeing Historical Archives (Long Beach) for her patient assistance; to Taigh Ramey for allowing unrestricted perusal of his manual collection and knowledge base and to Dave Menard, John Horne, William T. Larkins and Gordon Reid for graciously allowing access to their extensive photographic collections. (John Horne continues his intensive research into the history of the A-26 and he is always seeking additional stories and photographs. He can be contacted at 2 Bobuck Place, St. Helens Park, New South Wales 2560, Australia.)

Others who greatly assisted in preparing this material were Frank Bonansinga, Roger H. Besecker, Rick Colvin (Airspray), Ed Davies, Richard H. Denison, Bill Dooner (McClellan Aviation Museum), Jim Dunn, Malcolm L. Gougon, Geoff Goodall, A. Kevin Grantham, David Huffman (Vintage Air), David R. Kendziora, (Historian, Hill AFB), Gary Kuhn, Robert Mikesh, Beverly and Dick Otto, Lionel Paul, Milo Peltzer, Rolan Powell, Tony Ritzman (Aero Trader), John Sanford (Wright State University Library), Carl Scholl (Aero Trader), Jim Turner (Boeing Historical Archives), Stan Spurgeon (Confederate Air Force), Warren Thompson, Robert Walz, (Boeing Licensing), Randy Wilson (Confederate Air Force) and Barnett 'Skip' Young (386th Bomb Group Memorial Association).

Photographs were provided by a number of individuals and groups. Besides those mentioned above, the following are either the known photographer or the collection used: Harry B. Adams, Sigmund Alexander, Allied-Signal, American Aviation Historical Society, Brian Baker, D.H. Brazelton, Willam J. Balogh, Sr, John Blakee, Chester Blunk, Charles Cohen, Wilfred Corey, Leslie Dunning, Don Evans, O.C. Griffith, Al Hansen, Ernie Hendricks, Charles Hinton, Hill AFB History Office, John Horne, Elmer D. Howk, Duane Kasulka, Harry Klockson, Harvey Lippincott, Pat Marcella, Donald Mansfield, Dexter Martin, Harold G. Martin, Birch A. Matthews, Ken A. McLean, S.H. Miller, Lou Morales, Don Morrow, National Archives, Merle Olmsted, Milo Peltzer, Hans Petterman, Dick Phillips, Harry Popney, Doc Randles, Boardman C. Reed, Zak Ryall, Rodman St. Clair, Amos Salisbury, Henry Sanders, Walt Sheehan, D.E. Slowiak, Larry B. Smalley, Mary Smith (Tulsa Airport Authority), Kingman Snow, Ron Strong, Norman P. Thompson, Jack White and Gordon S. Williams.

Permission to quote from the recollections of Lt Col Ted Hankey and Lt Arden D. Connick in Chapter 5 is also gratefully acknowledged.

Finally, my loving appreciation for the continued support from my wife Lisa, and our three boys Adam, Lucas and Nathan in the preparation of this material.

Designed and typeset by Focus Publishing, 11a St Botolph's Road, Sevenoaks, Kent TN13 3AJ

Printed and bound in Great Britain by Bookcraft, Midsomer Norton

Contents

1. BACKGROUND 4
2. DESIGN AND DEVELOPMENT 12
3. DEVELOPMENT AND PRODUCTION 29
4. DESCRIPTION IN DETAIL 53
5. THE A-26 IN WORLD WAR II 75
6. POST-WAR, AIR NATIONAL GUARD, AIR RESERVE AND US NAVY SERVICE 93
7. KOREAN WAR SERVICE 107
8. A-26 AND B-26 IN FOREIGN SERVICE 124
9. THE CIA, THE USAF AND SOUTH-EAST ASIA: ENCORE 133
10. THE CIVIL A-26 AND B-26 147

Appendix I: A-26 Production List 172
Appendix II: Civil Invaders 177
Appendix III: Civil Registrations Assigned 183
Notes 186
Bibliography 188
Index 189

CHAPTER ONE

Background

The roots of the Douglas A-26 Invader, though entwined in the company that Donald Douglas built, can be traced direct to the perseverance and innovation of John K. Northrop. The engineering and manufacturing team Northrop put together during the 1930s created and built numerous advanced aeroplanes in partnership with Douglas. The A-26 emerged from this genealogy and it is necessary to examine the early history of several significant aviation pioneers and the companies they created to understand where the Invader came from.

To stand today at the corner of Aviation Way and Imperial Highway, located on the south-eastern edge of the giant Los Angeles International Airport (LAX) in southern California, one would not be struck that this is hallowed ground for aviation. Nameless buildings spread north and south, east and west from the busy corner. Sweeping ribbons of concrete soar above street level as the elevated Century Freeway carries frenzied California motorists on their way. Modern aviation is ever present, evidenced by the constant whine of turbofan engines from endless streams of arriving Boeing 747s and Airbuses touching down on Runway 25 Left at LAX.

Aviation history is also here, but it is quiet. It must be searched out with discernment and foreknowledge. Go beyond the façade of a business complex located near the intersection, back behind a parking lot where cars are parked only when there are no other places to go. Behind a chain-link fence is a big, long building with painted-over windows and a gigantic 50ft door – a door that does not make any apparent sense. A door to nowhere except that shiny new aeroplanes once passed through it when they first met the sunshine. What lies here is part of the old Northrop factory that once produced Gammas for civil aviation, A-17s for the Air Corps and BT-1s for the Navy. By the end of the 1930s the factory became the El Segundo Division of the Douglas Aircraft Co., building SBDs and A-20s. Later AD Skyraiders and A-4 Skyhawks rolled out to be taken across Imperial Highway to waiting runways. Then the building faded away, its heritage lost in downsizing and corporate mergers.

The irony is that there is still a big plant located nearby, a large remnant of the old Douglas manufacturing complex. It is operated by the giant Northrop-Grumman Corp., a company related to the original Northrop like a third cousin twice removed. It is unlikely that anything resembling an aeroplane comes out of that plant; the company does not build whole aircraft anymore. Besides, aircraft are not built that way today.

The early years of aviation in southern California had a fraternal quality. Designers and entrepreneurs, engineers and builders all worked together and apart, starting new companies and failing, starting again and folding into others as an infant industry began to grow. Names that were later attached to huge aviation corporations were then just those of young men excited about what aviation had to offer, names such as Loughead, Douglas, Vultee, Hughes and Northrop.

Donald W. Douglas

Douglas was born in Brooklyn, New York, in 1892, the son of a bank cashier. After growing up in New York, he won an appointment to the Naval Academy at Annapolis in 1909. Before he graduated, however, he resigned from the Academy to pursue aeronautical engineering. He attended the Massachusetts Institute of Technology and graduated in 1914. By 1915 he was employed at the Connecticut Aircraft Co. In that year, however, he left to join the Glenn L. Martin Co. in Los Angeles as chief engineer. The Martin Co. soon merged with the Wright Co. and operations were consolidated to the East Coast. Douglas resigned from Martin and became the chief civilian aeronautical engineer for the US Army Signal Corps. The new position was short-lived as he rejoined Glenn Martin in a new venture based in Cleveland, Ohio, again as chief engineer.

In 1920, however, Douglas left his position at Martin and moved to southern California to start his own company. Douglas formed a partnership with David R. Davis, a wealthy sportsman, to found the Davis-Douglas Co. in July 1920. The primary interest of Davis in the company was the design and development of an aircraft capable of flying non-stop across the United States. Design work was



Donald W. Douglas was a determined aviation businessman who turned a small Santa Monica factory into a huge corporation producing thousands of aircraft. Despite the depression, Douglas backed Northrop's new company in 1932, becoming the majority shareholder with 51 per cent ownership. The Northrop plant, six miles south of Santa Monica at Mines Field, was folded into Douglas Aircraft in 1937. Boeing Historical Archives

conducted in the back room of a barber's shop, and a small factory was obtained in Los Angeles. The result of Douglas's work was the Cloudster, which first flew in February 1921. Though it did not successfully complete the transcontinental flight, it represented the first of a long line of Douglas products.

After the design work on the Cloudster was completed, Douglas began the design of a new torpedo bomber for the US Navy. In April 1921 the Navy signed a contract with the Davis-Douglas Co. to build three examples of the new aeroplane, designated by the Navy as the Douglas DT. Davis, however, lost interest in the company after the Cloudster was completed, and Douglas decided to reform a company without him. Douglas needed financial backers for his new venture, and he was able to persuade several prominent Los Angeles businessmen to guarantee a bank loan. Douglas incorporated his company, the Douglas Co., in July 1921. Within a year he had established a factory at an old film studio located in Santa Monica where production DT-2 bombers were being built. Within another year Douglas was designing a derivative of the DT-2 as the Douglas World Cruiser for the Army and a planned round-the-world flight. It was with the World Cruiser that Jack Northrop first became associated with Douglas.

John K. Northrop

'Jack' Northrop first expressed an interest in aviation in 1911 when, as a sixteen-year-old boy, he witnessed a French aviator assemble and fly an aeroplane from a field near Los Angeles. Growing up in Santa Barbara, California, Northrop eventually went to work as a draughtsman-engineer for Allan and Malcolm Loughead and their new Loughead Aircraft Manufacturing Co. His background was limited, with only a high-school diploma and some drafting experience, but he made up for this with enthusiasm and innovation. By the age of twenty-two, Northrop had designed the wings for the F-1 flying boat, a ten-passenger seaplane. He was drafted for military service in World War I but was soon released and returned to Loughead to help to engineer the production of flying boats. After the war ended Northrop designed the S-1 personal aeroplane for Loughead. The aircraft was years ahead of its time, utilizing a moulded-wood, monocoque fuselage. However, an expected post-war market never appeared and the company closed its doors in 1920.[1]

Northrop left aviation for several years, going to work for his father. However, in 1923 he moved to Santa Monica and began work for the Douglas Aircraft Co. as a draughtsman. Design work was under way on the Douglas World Cruiser, and Northrop was assigned the task of engineering the fuel tanks for it, soon to be used for a round-the-world attempt by the Army in 1924. He continued to work at Douglas until 1927 when he returned to his old employers Allan and Malcolm Loughead. However, they had since changed the spelling of the family name and Northrop now worked for the new Lockheed Aircraft Co. in nearby Hollywood.

At Lockheed he designed one of his signature aircraft, the Lockheed Vega, for which Northrop would be remembered even if he had never worked on another aeroplane. The Vega was a revolutionary design, built around a wooden monocoque fuselage and a single, cantilevered wing with no struts, braces or other parasitic drag. The single-engine, five-place Vega, which first flew in July 1927, was a sign of things to come. Aviators such as Wiley Post, Amelia Earhart and Paul Mantz, and many others, utilized the Vega in subsequent years. However, Northrop's passion lay not in production, but in developing new and radical concepts to push aviation forward, ideas such as flying wings and all-metal aeroplanes.

Wanting to pursue his innovative abilities, Northrop struck out on his own in 1928 when he and his partner Ken Jay, along with several investors, formed the Avion Corp., first in Los Angeles and then at nearby Burbank. Northrop did pioneering work on aircraft structures, including the construction of the Avion aircraft, an all-metal design with a large chord multi-cellular wing and twin booms – precursor to his future flying wings. Through the innovation expressed by the Avion, Northrop's company was bought out by the United Aircraft and Transport Corp., a holding company that owned Boeing Aircraft and several other aviation companies and airlines. Avion was reorganized as the Northrop Aircraft Corp.



John K. 'Jack' Northrop was a visionary aviation pioneer. His advanced ideas about aircraft design saw fruition in several companies that bore his name and a dozen aircraft that pushed the aerodynamic envelope. Among these were the Lockheed Vega, the Northrop A-17, the Douglas DB-7, the Northrop P-61 and the flying wing B-35 and B-49. His design team produced the DB-7 attack bomber and the follow-on Douglas A-26. Boeing Historical Archives

The new company's first model was the Alpha, another revolutionary design that used all-metal, stressed-skin construction, a method soon to become standard. The Alpha, which first flew in March 1930, was a single-engined, low-wing monoplane that could carry up to six passengers in the cabin, with the pilot seated in an open cockpit above and behind the cabin. Alphas were designed as airliners and some were put into service as such. However, shortly after the aircraft went into production, new Bureau of Air Commerce guidelines essentially mandated twin-engined designs for airline use.

Following the Alpha design came the Northrop Beta, a smaller aircraft with similar features. It was a beautiful aeroplane that looked and flew better than contemporary Air Corps fighters but was aimed at the sportsman pilot. However, timing is everything and in September 1931, as the Great Depression

settled over the nation and the aviation industry, United Aircraft's management decided to merge the Northrop company into another United company, the Stearman Aircraft Co., at Wichita, Kansas. Northrop was unwilling to move to Kansas, so he resigned and again struck out on his own.

The Douglas Co. meanwhile had continued to prosper through the 1920s. By 1926 the company was producing 120 aircraft a year, with continuing increases each year. Products developed and built included the O-2 Army observation aeroplanes and its derivatives, the M-4 mailplanes and additional torpedo bomber designs for the Navy. The company was reorganized in 1928 as the Douglas Aircraft Co. and the factory was moved to Clover Field in Santa Monica. Capital raised from selling stock in the new company paid for the construction of a factory on a 7-acre (3ha) plot on the small airfield. Though stung by the economic crash of 1929, the Douglas Aircraft Co. continued to enjoy military production contracts into the 1930s that kept the company profitable through the worst of times. Net sales in 1930 remained over $4 million at a time when most aviation producers were going out of business.



The Los Angeles Municipal Airport, otherwise known as Mines Field, located 8 miles (13km) south-west of the downtown area. This view, probably taken in the mid-1930s, looks toward the east. Just to the south-east of the runway complex can be seen the new North American Aviation plant and, behind it and across the Imperial Highway, the buildings of the El Segundo division of Douglas. This field became the Los Angeles International as the field expanded north and west of the original airport. Several of the old buildings still exist on the south side of the runways. Boeing Historical Archives

Northrop Corp.

In January 1932 the paths of Donald Douglas and Jack Northrop crossed once again. Douglas offered to support Northrop in the formation of a new Northrop Corp. Douglas was majority owner of the new company with 51 per cent of the stock ownership. Northrop became the president of the new company and a vice-president of Douglas Aircraft. With Northrop's experience and enthusiasm for all-metal, low-drag aircraft, the intent of the new subsidiary was to develop new concepts in aerodynamics and construction. Northrop's first and immediate contribution to Douglas was his work on the wing design of the DC-1 under development at Santa Monica, but work was also begun on two new designs that became the Gamma and Delta models.

In March 1932 Northrop acquired the former Moreland Aircraft plant located near Los Angeles Municipal Airport, also known as Mines Field (now LAX), in El Segundo. The company president G.E. Moreland had built a modern aircraft production plant on a 15-acre (6ha) tract south of Imperial Highway in 1928 and began producing single-engined aeroplanes. Despite the quality of the products, the economy would not support the company and it was forced to close its doors in 1931.[2] Moreland, by the way, employed a young draughtsman named Ed Heinemann, a name that would figure prominently in the future of Northrop and Douglas. Heinemann moved on to work for Lockheed in 1929 and, later, Northrop. He would be with Northrop when the company moved into the old Moreland building in 1932.[3]

After moving into the Moreland facility, the first aircraft developed by the new Northrop Corp. was the Gamma, a single-engined, low-wing monoplane first produced in 1932. Custom-built Gammas were delivered for use by Texaco and its pilot Frank Hawks, and for the Lincoln Ellsworth Trans-Antarctic Expedition of 1934. Other examples were sold to civil customers and modified versions were exported to China for use as light bombers. The Northrop Delta was conceived as a passenger transport and featured a larger fuselage than the Gamma but used essentially the same wing. New restrictions on the use of single-engined airliners greatly reduced the market for Deltas and only thirteen were built.

From the Gamma, however, sprang Northrop's first large production contract. In March 1935 the Air Corps bought 110 A-17 attack bombers, a design derived from the Gamma. The bomber was later improved with retractable landing gear and another hundred were eventually built as A-17As. Export models of the A-17 were designated as the Northrop 8A and more than a hundred examples were delivered between 1938 and 1941, after Northrop had become the El Segundo Division of Douglas.

Beginning in 1934 the Northrop Corp. enjoyed significant growth. As the year began, the company employed fewer than a hundred, but it was expected that substantial production orders for several Northrop designs might be forthcoming.

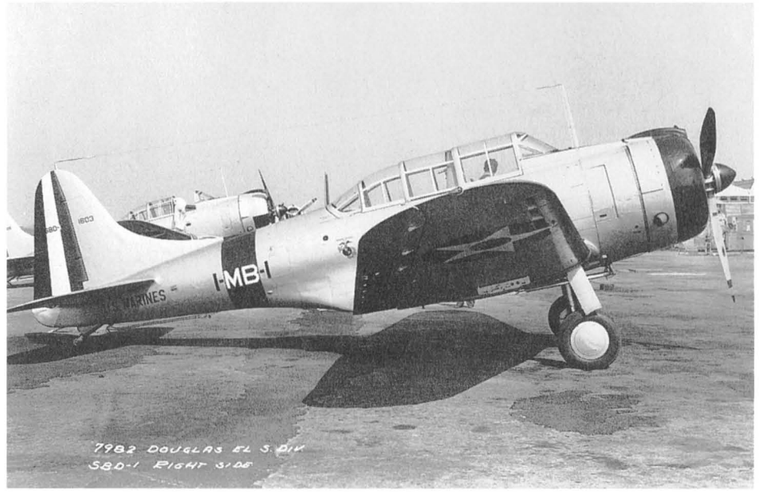


Left: **One of Northrop's most successful early designs was the A-17 attack bomber, largely derived from the earlier Gamma series. Going into production at El Segundo in 1935, 241 were eventually built for the Air Corps, with additional examples delivered as the Model 8 for export. This example was A-17 s/n 35-67, delivered in 1936.** Boeing Historical Archives

Below: **The Douglas–El Segundo plant looking toward the north-west, with the North American Aviation facility at the upper right and the old passenger terminal at the upper centre. The plant was built by Pickwick Motor Coach and was obtained by the Northrop Corp. in March 1932. Northrop built Gammas and Deltas here, moving on to the A-17 and the SBD. Douglas took over management in 1937. The plant eventually expanded south and westward and produced a continuous stream of aircraft over the next thirty years including the A-20, the A-26, the AD Skyraider and the A4D Skyhawk.** Boeing Historical Archives



The company moved to a another facility located half a mile east of the old Moreland plant, to land south-west of Imperial Highway and Aviation Way within the city limits of El Segundo. A 75-acre (30ha) tract was purchased that contained the vacant Pickwick Motor Coach factory. The land, building and tools were obtained for $25,000.[4] The vacant building was modified to become the new home of the Northrop Corp. As before, new aircraft had to be transported the short distance to Mines Field for delivery. The old Northrop plant was sold to Interstate Aircraft for their use.[5] On the north side of the Imperial Highway and across the street from the new Northrop factory would be the site for the new North American Aviation facility in Inglewood.



The Douglas SBD series had its origin in the Northrop BT-1 of 1934. In 1936 the US Navy requested that one of the fixed-gear BT-1s be modified with a fully-retractable landing gear. The modified aircraft became the prototype for the SBD series, the aircraft receiving the Douglas designation after the Northrop Corp. was integrated into Douglas in 1937. Heinemann was the chief designer of both the BT-1 and the SBD. Boeing Historical Archives

Ed Heinemann

Heinemann, as noted earlier, came to play a significant role in the history of the Douglas Co. He had first come to work at Santa Monica in 1926 where, at the age of eighteen, he traced drawings of Douglas O-2 observation aeroplanes. Heinemann, although he had not even completed high school, had an innate talent for aircraft design and caught the eye of both Douglas and his chief engineer Dutch Kindelberger. None the less, Heinemann and others were laid off from Douglas in 1927 due to lack of work. He went to work for Standard Oil at El Segundo, doing mechanical drawings but jumped at the chance to get back into aviation. He was asked to design an improved landing gear for an aircraft built by International Aircraft at Long Beach and soon became an engineer for the company. However, International moved to Ohio in 1928, leaving Heinemann to look elsewhere for work. The Douglas Co. was building aeroplanes again and Heinemann went back, this time as an engineer. However, aviation is nothing but fluid and, in October 1928, he was offered an opportunity to move over to the Moreland Aircraft Co. at Mines Field. He eventually became Moreland's chief engineer and designed the Moreland Trainer for the company. Meanwhile, Northrop had started his new company at Burbank and soon hired Heinemann as an engineer. Though he still had no formal training, his growing experience was apparent. In his autobiography Heinemann recalled:

> I had been steeped in some meaty projects. Through a process of on-the-job experience and absorption of knowledge from some very brilliant gentleman, I found myself growing increasingly confident in my skills. I was getting a real feel for detail design techniques. In a way it was like an artist on the fringe of achieving a style, singularly his own, after having mastered the basics. I didn't consider myself a specialist by any means. Rather, I had a healthy respect for those who were professionals in, say, stress analysis or hydraulics. I did feel that I had substantial expertise in all areas of aircraft design and construction, those engineering elements needed in putting a plane together from the first bolt to last.[6]

When the Northrop company was consolidated at Wichita in 1931, Heinemann went to the nearby Lockheed company to work as a draughtsman. The economy was in confusion, however, and his time with Lockheed was brief. By late 1931 Lockheed was unable to pay its employees any longer and Heinemann was able to shift back quickly to Douglas at Santa Monica.



Edward Heinemann was the chief engineer at the El Segundo Division and ran the development of both the DB-7 (later A-20) and the A-26 between 1937 and 1942. Though both the A-20 and the A-26 were designed and developed at El Segundo, most of the aircraft were built at other Douglas facilities. Heinemann went to work for Northrop at El Segundo in 1932 and remained with Douglas until 1960. Boeing Historical Archives

However, Northrop beckoned once more with his new company being formed at the old Moreland plant at Mines Field. Douglas consented to Heinemann's moving over to Northrop in January 1932, at the age of twenty-three. This time he planted roots and stayed with Northrop and, later, Douglas, at the El Segundo facility for the subsequent twenty-seven years, mostly as chief engineer or manager. As head of the aircraft design team, Heinemann had a major role in all the major attack aircraft projects that came from Northrop and Douglas, including the A-20, the A-26, the AD Skyraider and the A4D (A-4) Skyhawk, to mention only a few.

But that was all to come. In late 1934 Northrop and Heinemann started work on their first project, a Navy request for a new dive-bomber. The result became the BT-1 series, a single-engined aircraft that drew much from the earlier work done on derivatives of the original Northrop Gamma. A small production contract was awarded in 1936 for the production of fifty-four BT-1s. In 1936 a single BT-1 was modified by Northrop to feature a fully retractable landing gear, and the resulting design was eventually produced by Douglas at El Segundo as the SBD Dauntless series.

Models 7A and 7B

Also in 1936, and significant in the design and development of the A-26, the Northrop engineers began development work on the Model 7A, a twin-engined, light attack bomber. With Northrop as chief engineer and Heinemann as project engineer, the initial concept for the bomber was speculative on the company's part, for there were no Air Corps specifications yet developed for such a proposal. What emerged was a small, slim, high-wing design powered by a pair of 450-horsepower Pratt & Whitney R-985 Wasp Jr engines. With a two-man crew, the all-metal design featured a number of innovations, including tricycle landing gear and a bomb bay that could be fitted as an observation or reconnaissance position. The design concept called for a 1,000lb bomb load and a maximum speed of 250mph (400km/h). However, the Model 7A never proceeded beyond the mock-up stage. Lessons learned from combat experience in the Spanish Civil War were not lost upon either the Air Corps or aircraft designers, and Northrop shelved the Model 7A in December 1936.

As 1937 began, so did labour problems at the Northrop Corp. Conflict brewed over the interpretation of a union agreement and production delays began to affect contracted delivery schedules. The War and the Navy Department pressed Northrop to resolve the labour difficulties to ensure the smooth production of their aircraft. Toward that end, Donald Douglas decided to have Douglas Aircraft acquire the outstanding 49 per cent of the Northrop stock in April 1937, making the Northrop Corp. a wholly-owned subsidiary of Douglas. However, continuing labour turmoil culminated in a general strike on 2 September 1937, and shortly afterwards the Northrop plant was closed. The entire production workforce of 1,400 was subsequently laid off. Issues revolved around production slowdowns and planned lay-offs. Donald Douglas announced that there was doubt whether the plant would ever reopen.[7] The Northrop Corp. was dissolved on 8 September 1937. Aircraft in production at the time included the A-17 for the Air Corps and the BT-1 for the Navy. Engineering staff at Northrop were transferred to the Douglas payroll at Santa Monica and the Northrop plant was locked.

Seven weeks later, however, on 21 October, the dispute was resolved and the Northrop plant reopened. Production demands were mushrooming and any need for lay-offs evaporated. The Northrop facility was reorganized as the El Segundo Division of the Douglas Aircraft Co. After a discreet period, Jack Northrop announced his resignation as both general manager of the Northrop plant and vice-president of the Douglas Aircraft Co. The resignation became effective on 1 January 1938, with Donald Douglas expressing regret at his departure and Northrop expressing interest in new non-aviation projects. A short time later, though, Northrop was founding yet another incarnation of a Northrop Aircraft Corp. at nearby Hawthorne Airport. The new company would enthusiastically pursue the innovative talents of its founder, developing aircraft such as the P-61 Black Widow, the XB-35 and he YB-49 flying wings, and carrying the Northrop name through the second half of the century.

Meanwhile, E.R. Doak, a former vice-president of Douglas, became the new general manager of the El Segundo Division, with Heinemann becoming chief engineer. In late 1937 the Army

In 1936, Heinemann and Northrop began design work on the Northrop Model 7 light attack bomber. Though the Air Corps had not requested the development of such a machine, Northrop decided that there was a market for a twin-engined, light attack bomber and proceeded. But the Model 7A never got past the design stage because the Air Corps requested a heavier and higher performance bomber in 1937. The Model 7B was the result, a complete redesign of the original. By the time the 7B prototype was built Douglas had taken over and the project proceeded as the Douglas DB-7 and, later, as the A-20 Havoc. The DB-7 shown below was built on a French contract. Boeing Historical Archives



issued specifications for a light attack bomber to include a 1,200-mile (1,930km) range, a 1,200lb bomb load, and a top speed of 200mph (320km/h). Proposals were due at Wright Field not later than July 1938 for evaluation.

Heinemann and his design team brought the Model 7A off the shelf, modifying the Northrop design to meet the Army request. The Model 7A was projected with a maximum gross weight of 9,600lb (4,400kg). The revised design, retaining a Northrop designation as the Model 7B, was larger and half again heavier, with a maximum gross weight of 15,000lb (6,800kg). The lines of the earlier design were still present, but the Model 7B was essentially a new aeroplane. The proposed powerplant was the 1,000 horsepower Pratt & Whitney R-1830 Twin Wasp engine, offering twice the power of the earlier R-985s installed on the Model 7A. Armament was added, the option of alternative nose sections was offered and the design bomb load was boosted to 2,000lb (900kg).

Four other companies offered proposals to the Air Corps: North American offered the NA-40, Stearman their X-100, Bell showcased its Model 9 and Martin their Model 167. The Air Corps, after reviewing all the designs, responded with a request that each company build a prototype aircraft, at its own expense, for a design competition. The deadline for entries was 17 March 1939. Bell declined, but the other companies proceeded in the hope of a large production contract.

Heinemann and the design team finalized the Model 7B and a prototype was constructed. It first flew from Mines Field on 26 October 1938, as a civil aeroplane. The crew complement remained at two in the slim fuselage: the pilot in the cockpit and a gunner located in a compartment aft of the bomb bay. However, one of the offered nose sections was a bomber nose with a position for a third crewmember, the bombardier. The solid attack nose configuration was fitted with six .30 calibre and two .50 calibre machine guns. When the bomber nose was fitted provisions were made to install two .30 calibre guns on each side of the cockpit for strafing.

A company flight test programme began at Mines Field and the Model 7B was found manoeuvrable and easy to fly. A few minor changes were made aerodynamically to tune the design, but the result was generally satisfactory. During the flight test programme Douglas had quietly secured permission from the War Department to demonstrate the Model 7B to the French Purchasing Commission. The French, desperate to re-equip their obsolete air force in the face of an imminent European war, were looking for modern aircraft that could be produced quickly, and the Model 7B held a great deal of interest for them. The American government, sensitive to domestic isolationist sentiment and proclaimed neutrality, normally reserved new aircraft designs for the Navy and the Air Corps, offering them to foreign forces only if they were rejected by the US military. However, these were not normal times and the French were allowed to inspect the Model 7B at Mines Field and to observe demonstration flights.

On 23 January 1939, after a ground examination of the Model 7B by the French, Douglas test pilot John Cable started the twin engines on the prototype and taxied off for a demonstration flight. Also aboard, with or without permission, was a French military officer in the gunner's compartment. After take off, Cable made a low pass from west to east across Mines Field with one of the engines shut down and the propeller feathered. Heinemann later recalled that he had specifically instructed Cable not to perform such a manoeuvre, but as he flew down the airfield he slipped it back and forth to show how stable it was even while flying on a single engine. Unfortunately, he lost control and the Model 7B went into a flat spin and crashed into the parking lot of North American Aviation. Cable was able to bail out of the stricken aeroplane, but his parachute was unable to fully open in time and he was killed. The aeroplane was destroyed and the French passenger, trapped inside, was severely injured. When it was revealed by the press that the French had been examining the model and that an observer was on board when it crashed, a political storm was ignited that went all the way back to Washington, DC.

Despite the crash of the prototype and the political upset, the French were suitably impressed with the design and desperate enough to press for a production contract. On 15 February 1939 the French placed an order for a hundred Model 7Bs, though they requested some major changes in the design. Donald Douglas reluctantly gave permission to Heinemann to rework the design a third time to incorporate the French requests. Externally, the major changes to the airframe included changing the wing mounting from the top of the fuselage to near the mid-point; the nacelles were slung under the wings to allow a shorter landing gear; the fuselage shape was narrowed and deepened, and, internally, the fuel capacity was increased; and in the gunner's compartment, two 7.5mm French machine guns were added – one firing from the top and the other from the bottom. The nose section was revised to a standard bomber pattern, without the changeable nose option. The reworked design gained a new Douglas designation, becoming the DB-7 (Douglas, Bomber, Seven).

The reworked design was submitted to the Air Corps as part of the design competition to meet the original Army specifications of late 1937. Despite the lack of a prototype, the Air Corps reviewed the design, assigned the designation of A-20 to the aircraft and, on 30 June 1939, ordered sixty-three of the type. On the same day, the Air Corps also ordered 123 A-20As, the A-20A being considered the low-altitude attack version similar to the DB-7Bs that the Royal Air Force later ordered. Subsequently, the Air Corps ordered an additional twenty A-20As. The A-20s and the A-20As differed in detail from the DB-7As being built for the French, particularly in material, structure and armament. The A-20 production aircraft were ordered with versions of the more powerful 1,600 horsepower Wright R-2600 engine.

The first DB-7 flew on 17 August 1939, with initial deliveries to the French beginning in October. In early 1940 the British Purchasing Commission began reviewing American designs for purchase and placed an order for 150 DB-7s on 20 February 1940. The British order also provided for the installation of Wright R-2600 engines with other design refinements, the changes reflected in the model designation of DB-7B. The British had assigned the name Boston to the aeroplane, the DB-7B becoming the Boston Mark III, with the first deliveries occurring in mid-1941. The French also ordered a number of the higher-powered DB-7Bs, but France fell to the German army long before any aircraft could be delivered.

After several false starts in 1939, the war in Europe exploded in 1940. US policymakers quickly woke up to the reality



The Air Corps ordered the DB-7 into production in 1939 as the A-20, with sixty-three A-20s and 123 A-20As placed under contract. The A-20A was powered by two 1,600-horsepower Wright R-2600-11 engines, a significant increase over the 1,000-horsepower Pratt & Whitney R-1830s of the DB-7. This view shows an early A-20A at delivery on 4 September 1940. It was the efforts by the Air Corps to install heavy cannon on the A-20 that precipitated the design of the Douglas A-26 Invader. Boeing Historical Archives

of the world situation and the sorry state of the American military. As expansion plans were started in panic, requests for new designs and improvements to old designs rivalled for attention as the military called for new and better aeroplanes. A flood of orders from both the American and foreign governments quickly overwhelmed existing design and production facilities across the country.

By the fall of 1940 France had been overrun by the Germans, along with most of Europe, and the Battle of Britain was being played out in the skies above England. The new medium bombers for the Air Corps, the North American B-25 and the Martin B-26, had just enjoyed their first flights and tentative production was getting under way. Douglas was expanding its production line at Santa Monica to build A-20s and B-23s. A new plant was being built at Long Beach to produce C-47s for the Air Corps. Meanwhile, at El Segundo the first Air Corps A-20 had just flown but was not delivered, and the ramp at Mines Field was crowded with DB-7s just off the production lines awaiting delivery to the RAF. Aircraft from the French order were now being diverted to Britain. In addition, rolling from the factory across Imperial Highway from the airport were SBD Dauntlesses for the Navy. The El Segundo engineering group run by Ed Heinemann was given the task of the preliminary design work on the SB2D for the Navy, with the Air Corps requesting major improvements to the A-20 in response to the war. Even though the A-20 was fresh off the drawing board, efforts at Douglas were initiated to design a new attack bomber that could replace not only the A-20 but also the new medium bombers just getting into production.

CHAPTER TWO

Design and Development

Replacement for the A-20

In late October 1940 the Douglas Aircraft vice-president Arthur Raymond requested that the Air Corps Material Division at Wright Field provide some prioritization for several preliminary projects under development in the company. Among the projects was the engineering for the DC-6 transport, the design of a new medium bomber as a follow-on to the B-25 and the B-26, the design of a new dive bomber and the development of a new light bomber to replace the A-20. In a written reply to Douglas, dated 5 November, the chief of the Experimental Engineering Section outlined the Air Corps's priority for new programmes at Douglas. Based upon what, at that time, were incomplete research and development plans for fiscal year 1941, it was recommended that Douglas place the development of a light bomber ahead of any other programme. The letter also noted that the Air Corps had recently provided Douglas with specifications, designated XC-219, for a new medium bomber. As the Corps would not fund any research or development of a commercial transport, it was made clear that any effort in the DC-6 programme could only be a commercial venture by Douglas. Furthermore the Air Corps would rely upon Navy dive-bomber programmes for immediate needs and would not fund any research for Air Corps dive-bombers.

The letter also relayed that, though formal specifications for a new light bomber were not yet completed, there were five deficiencies identified for the Douglas A-20 that had come to light with the experiences of the European war. They were outlined as:

a. No interchangeability of crew. This is generally considered the most serious of all.
b. Insufficient defensive armament. Guns should be in powered turrets for all-around defense. .50 calibre [sic] guns preferable, if not mandatory, and ammunition supplies should be increased.
c. The design strength of 6.00 G ultimate which is reduced to 5.25 G when the gross weight is increased by modernization is too little for safety in the maneuvers now contemplated. Shallow glide bombing will be attempted with the A-20B, but there is no possibility of accomplishing a moderate form of dive bomber attack which the chief of the Air Corps has repeatedly asked for in this type.
d. Landing and take-off distances are considered too great for a close support airplane, which is required to operate from relatively unimproved fields within 100 miles [160km] of ground forces.
e. Speed now considered excellent for this size and type, but it will probably have to be increased for airplanes to be produced in 1942–1943, particularly the speed at intermediate altitudes.[8]

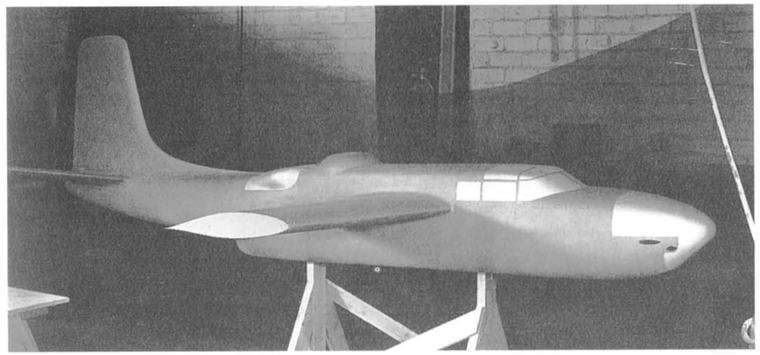


Design work for what was to become the A-26 began in late 1940 when preliminary drawings were prepared by Ed Heinemann for presentation to the Air Corps at Wright Field. The A-26 was proposed in three versions: a medium-altitude bomber (XA-26), a night-fighter version (XA-26A) and a ground-attack tank destroyer (XA-26B). In May 1941 a development contract was signed that provided a single example of each version for evaluation by the Air Corps. This December 1941 drawing by the late Douglas engineer and artist Robert Smith, better known today as 'R.E. Smith', shows the basic layout of the XA-26A night fighter. Note the radar operator's bubble canopy in the nose compartment, a feature that did not appear on the actual prototype. Armament was the four cannon under the bomb bay and dorsal gun turret equipped with four .50 calibre guns, as on the Northrop P-61 of the same vintage. Boeing Historical Archives

The letter also contained information that the Air Corps would shortly request a formal proposal from Douglas to modify an A-20 into a radar-equipped, night pursuit weapon. Though this modification would eventually become the P-70 programme, the request by the Corps no doubt influenced the development of the A-26A night fighter as a parallel programme to the A-26 light bomber.

Design studies were undertaken by Douglas through November and December 1940 in the expectation that the Air Corps would shortly release official specifications for the development of a new light bomber. The planned defensive armament system, originally developed by General Electric for incorporation in the A-20A, was instead designed into the new A-26. As part of the programme, the Wright Field Experimental Engineering Section arranged for the Air Corps to assign an A-20A to Douglas to develop the installation of the remote power turrets and sighting station. This modification, designated as the XA-20F project, provided valuable installation information for the A-26. Also in December 1940 Douglas requested the assignment of an A-17A for the aerodynamic testing of full-span, slotted flaps for possible use in the new light bomber design. Though full-span flaps were not included in the A-26 design, the new 'Douglas flaps', as the conventional-width slotted flaps became known, were used to reduce landing speed and distance on the new design.

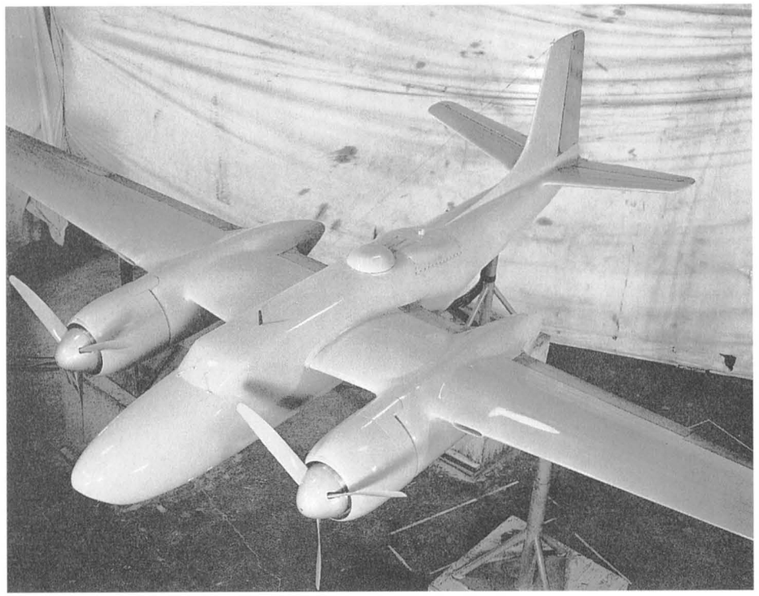
Offering a somewhat different view on the gestation of the Invader, Heinemann recalled a meeting with the Air Corps he had in mid-December 1940 at Wright Field. In his autobiography he remembered that he was returning from a detail in Cuba and stopped at Wright Field to discuss a proposal to add a 75mm cannon to the A-20 design. Heinemann was opposed to the idea because the A-20 fuselage was too narrow to accommodate the gun, a pilot and the gunner. Instead, he proposed a new design based upon performance figures desired by the Air Corps. He told his contact at Wright Field, Lt Col Sims, to 'give me two or three weeks' to pull together a proposal for a new attack model. From the documented record, though, it is evident that informal discussions between Douglas and the Air Corps had begun at least six weeks earlier.



Early mock-up model of the XA-26, shown here in April 1940. By any measure the design was sleek, the fuselage dominated by the long bomb bay. The notch behind the bomb bay is indicated on the mock-up but without the ventral turret. Also missing from the mock-up are the engines and huge nacelles. Boeing Historical Archives

The Air Corps released the new light bomber specifications, designated XC-220, on 21 January 1941. The Douglas Co. responded immediately with a proposal for what became the A-26. On 27 January the company forwarded to the Corps Douglas Specification DS-536, outlining the design of two aircraft, the first of which was a twin-engined light bomber as requested by XC-220. The second, based upon the design of the first, would be equipped as a night pursuit aircraft. Interestingly, neither design provided for the installation of the 75mm cannon mentioned by Heinemann as being the impetus for the new aircraft.

The Douglas proposal referred to the 'informal negotiations between the Material Division and this Contractor's representative at Wright Field' that had been on-going since the late fall of 1940. What is notable is that the specification sheets of 27 January 1941, submitted with the proposal, already referred to the 'Model XA-26'. The proposal itself did not mention an Air Corps designation for the new aircraft, calling it instead the 'light bomber per specification DS-538'. Though most sources note that the A-26 was never assigned a Douglas model number, there are several Air Corps documents that referred to the aircraft as 'Contractor's Model No. 538', one example being the contract change order



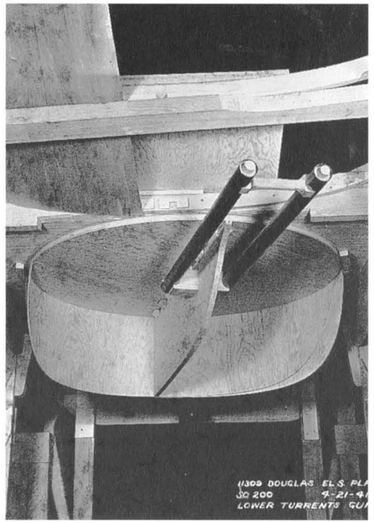
This view shows a wind-tunnel model of the XA-26. Note the movable control surfaces and sleek finish. Except for the propeller spinners, this external configuration was carried through to the production A-26Cs. Boeing Historical Archives

of 9 June 1941. This change order specified that the Air Corps was ordering the Model No. 538-C ('C' being the third version of the model) as the XA-26B. (A later Douglas design, the D-558 Skystreak/Skyrocket, did carry its design specification number as a Douglas model number.) However, in the case of the A-26, no Douglas documents have come to light calling the aircraft anything except the A-26. In any event, one could assume that the Corps was serious enough in its informal negotiations to assign the Douglas bomber an 'attack' designation early on, even without a formal proposal from Douglas.

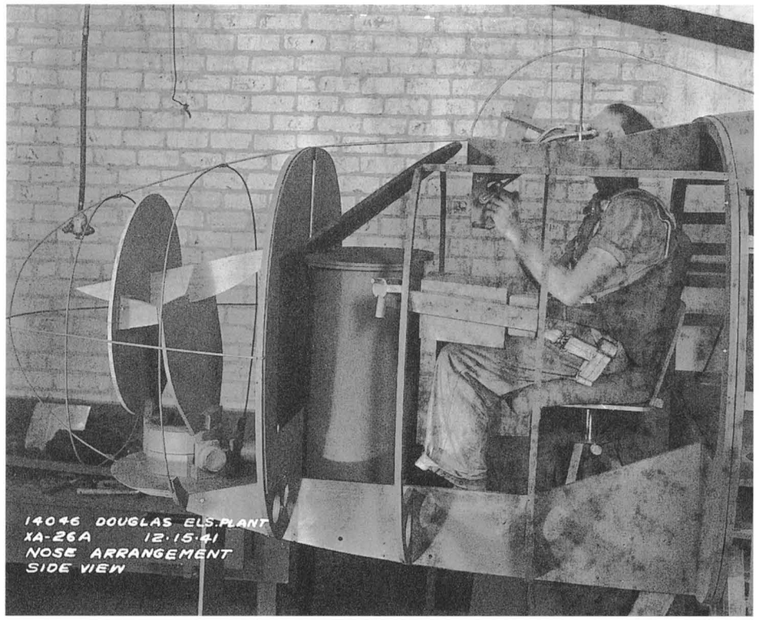
Basic Design

The basic design provided for a twin-engined light bomber with provisions to carry a three-man crew: pilot, gunner and bombardier. The engines selected to power the bomber were the 2,000 horsepower Pratt & Whitney R-2800-25BGs, the same engine as was used on the new Martin B-26 also under development. The calculated empty weight of the design was 20,450lb (9,300kg), with a proposed useful load (crew, bombs, arms and fuel) of 5,550lb (2,500kg) for a maximum operating weight of 26,000lb (11,800kg). Expected maximum speed at 17,000ft (5,200m) was 372mph (600km/h), some 30mph (48km/h) faster than the A-20 design with about the same combat range of 683 miles (1,100km/h). At this point in the design process, the fuel capacity (US gallons are used throughout the book) was only 690gal (2,600ltr) (wing fuel: 440gal [1,650ltr]; bomb bay tank: 250gal [950ltr]). In comparing the new design against the older A-20, the expected performance was a marked, though not dramatic, increase. The design and general construction were conventional; however, it did incorporate a laminar flow aerofoil and remote gun turrets. Both features were being also used in other contemporary designs, such as the North American P-51 (aerofoil) and Boeing B-29 (turrets).

The wooden mock-up of the ventral turret, shown here in April 1941. The profile of the gun turret appears much higher than the General Electric turrets eventually installed on the actual aircraft. Compare this view with that on p.59 showing the actual turret installation. The remote turrets were a new feature and used in the design of both the A-26 and the contemporary B-29. Boeing Historical Archives



Wooden mock-up sections were constructed in one of the El Segundo buildings, both for Air Corps inspection and installation fitting. This view shows the nose section of the XA-26A night fighter with the radar operator crew position and the airborne-intercept radar. The constructed prototype did not have a Plexiglas bubble for the radar operator, possibly because it had been determined that the radar operator did not need an external view. Boeing Historical Archives



Also of interest was the incorporation of a stronger aluminium alloy, designated as 75S, into some of the structure. Though more difficult to form and use, the alloy had a much higher strength-to-weight ratio than the conventional 24S alloy used in most aircraft structures. Later, Heinemann would comment on the use of the 75S alloy in the A-26:

> It was a new material and using it was a bit of a gamble. It had higher-temper heat treatment and could save considerable weight if it would work. We handled it with respect and avoided stress concentrations. We also applied new fitting factors. We did have some problems, but they were few … In the end, the A-26's 75S proved beyond a doubt that, if used properly, it was a superior alloy.[9]

The origin of the requirements for the night fighter version of the aircraft is obscure. They were evidently not contained in the Air Corps XC-220 specifications. It is apparent, however, that Douglas and the Corps had been discussing modifications to convert the

A-20 into a night fighter so it is probable that an Air Corps request was made to develop a night-fighting version of the new bomber also. The night fighter differed from the basic design in having an AI-4 airborne intercept (AI) radar unit installed in the nose section, a radar operator position between the radar unit and the cockpit, and four 20mm cannon installed in the forward part of the bomb bay. The ventral turret was deleted and the upper turret was provided with four .50 calibre guns, similar to the XP-61, also under development.

Douglas promised to deliver the prototype light bomber twelve months after a contract was signed, or 'twelve months after the final approval and acceptance of the specifications by the Air Corps',[10] whichever was the later. The night pursuit aircraft would be delivered three months later, 'provided that all design information for the AI and four gun turret' was received by Douglas within three months of the contract date.[11]

Douglas expected eventually to mass produce the bomber and the night fighter under contract. The proposal provided that:

> … these experimental airplanes will be designed with full attention given to mass production possibilities, but that the data supplied will be no more complete than is usual for experimental contracts. The series of wind tunnel tests … even though extensive for an experimental contract, are considered to be an economical means of expediting delivery of satisfactory airplanes, particularly since very little data or experience is available concerning the laminar flow wing section which will be used, and since full scale tunnel testing of the complete power plant installation will permit an early solution of possible cooling problems. Performance of all of these tests will also ensure the possibility of entering into mass production of the type with the fewest changes of the experimental model, thus minimizing and reducing the expense of the complete program.[12]

In their proposal Douglas offered to construct the two prototypes with all the pertinent aerodynamic wind-tunnel testing, engineering data, models, photographs and blueprints for the contract price of $2,519,792.86. They calculated the cost of the XA-26 as approximately $1.4 million and the XA-26A as $900,000, with the other associated costs making up the total. Douglas's proposed contract cost, however, was considered excessive by the Air Corps.

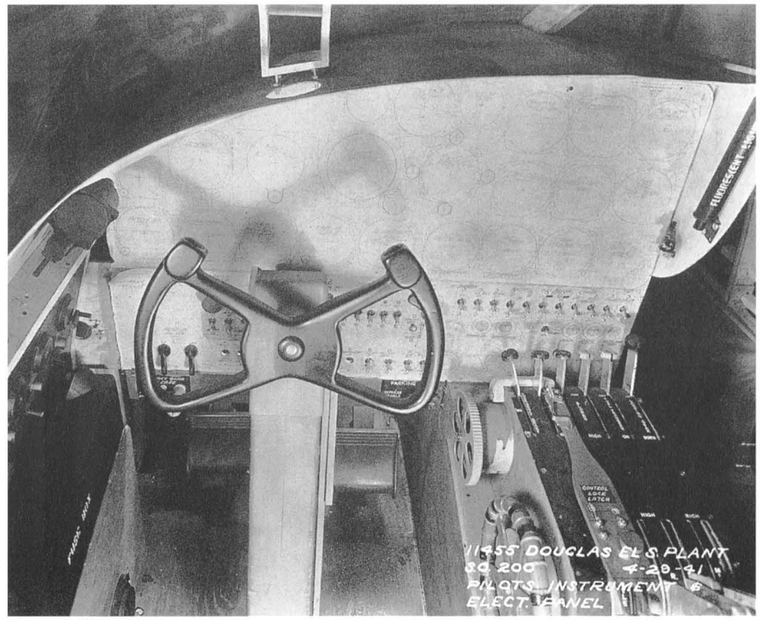
In a document dated 13 February 1941 the Wright Field Experimental Engineering Section offered a comparison between the costs of new aircraft under development using a dollar cost per pound analysis. The North American XB-28 was offered at $16.10 per pound ($35.60 per kg); the Boeing XB-29 was set at $18.50 per pound ($40.90 per kg), the Northrop XP-61 at $28.94 per pound ($63.96 per kg) and the XA-26 at $48.46 per pound ($107.10 per kg), nearly three times that of the B-29 programme. A note of explanation was offered for the price of the XA-26:

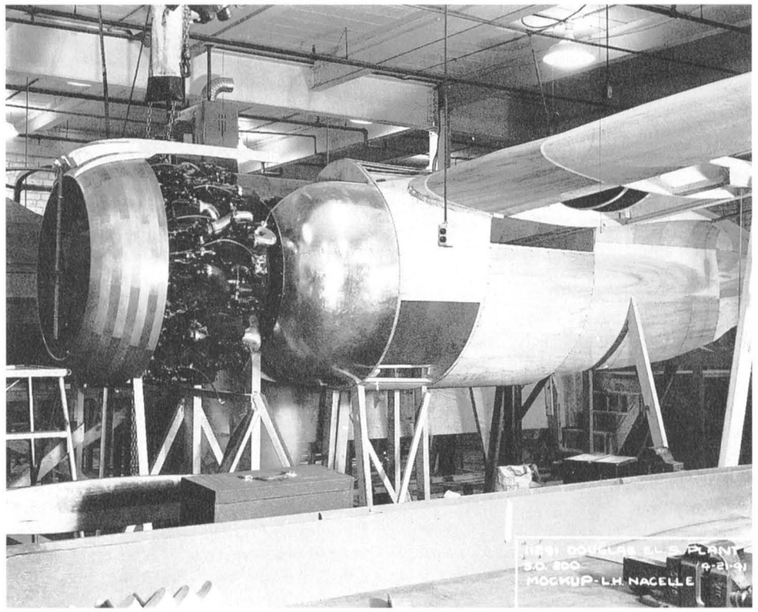
> With reference to the price quoted by the Douglas Aircraft Co. for the XA-26 and XA-26A Airplanes, the Experimental Engineering Section has repeatedly attempted to obtain lower quotations from Douglas, but without success. In partial justification for the higher price per pound charged for the XA-26 and XA-26A, your attention is invited to the fact that the XA-26A (Night Fighter) version of the airplane is radically different from the straight XA-26, and therefore Douglas is, in effect, quoting on the design and construction of one each of two different airframes.[13]

Despite the rationalization, the Air Corps balked at the expense of the A-26 proposal and months of negotiations and delays would ensue. It was not until late May, nearly four months later, that an agreement was finally reached.

The formal design process of the aeroplane continued, even without a development contract in place. At El Segundo, Heinemann assigned Bob Donovan as project engineer. The early design layout of the XA-26 caused some aerodynamic concerns, particularly with the size of the engine nacelles. In early February 1941 a conference was held at Langley Field, Virginia, between representatives from Douglas, the Air Corps and the National Advisory Committee for Aeronautics (NACA). Two questions were to be discussed: the fuselage shape and the engine nacelles.

The mock-up of the cockpit and instrument panel for the single-pilot model. The centre quadrant and the instrument panel changed considerably between the mock-up and the prototype. However, the Air Corps foresaw pilot visibility problems after inspecting the mock-up, a deficiency that was not corrected until the fall of 1944, nearly thirty months later. Boeing Historical Archives





Wing and nacelle and cowling mock-up in April 1941. Only the left wing mock-up was constructed in an effort to save time. The unique engine mount appears to be constructed of metal and has an actual R-2800 attached. Missing is the oil cooler intake on the outer wing panel. The carpentry craftsmanship on the mock-up is readily apparent. Boeing Historical Archives

Apparently the Air Corps had concerns about the aerodynamics of the square-section fuselage as compared with the circular cross-section of the new Martin B-26. NACA representatives confessed that they had little data on the advantages of either concept, but concluded that the larger size required by the circular cross-section and problems with the aerodynamic joint between the fuselage and the wing would negate any advantage of the circular design. It was decided that extensive wind-tunnel testing would be done using a one-eighth scale model of the airframe both at the California Institute of Technology (Cal Tech) at Pasadena, California and at the NACA facility at Langley. Tests of a full-sized mock-up nacelle would also consider engine-cooling problems.

The other question raised was the perceived length of the nacelles, considered excessive by the Air Corps and the source for much aerodynamic drag. The conference concluded that the nacelle had to be long enough to position the propeller arc ahead of the cockpit (presumably for safety reasons) and to allow for the landing gear to be installed in the aft part of the nacelle. The conference summary noted:

> With reference to the length of the nacelle, it appeared that the length was determined by the position of the propellers with reference to the pilot's cockpit and the personnel quarters in the fuselage and by the space needed for retracting the landing gear, it did not appear possible to make it any shorter for practical reasons and nobody suggested making it any longer.[14]

NACA determined that the number of scoops and other protuberances on the nacelle would have a greater effect on the nacelle drag than its size.

Given the necessity to work out many of the design problems early in the programme, a major commitment was made to wind-tunnel testing. The contract proposal for the prototype XA-26 and XA-26A contained provisions for the following wind-tunnel models: one power model; one power model for the 19ft (6m) NACA tunnel at Langley; one large tunnel nacelle including power; and two large, laminar-flow, constant-chord wing sections for the NACA tunnel. Also included in the proposal was a complete, full-scale engine installation for ground running in a NACA wind tunnel for a test series to be conducted at the government's expense.

Heinemann attributed the selection of the laminar airfoil selection to Dr George W. Lewis of NACA and his team of aerodynamicists. The aerofoil required a completely smooth wing surface with no wing rivets, wing screws nor skin laps. Additionally an effort was made to produce a stiff wing to eliminate skin waviness that would disturb the ever-important laminar flow. According to Heinemann's account, he convinced Lewis of the importance of doing a large model test of the A-26 design in the 60ft (18m) wind tunnel at Langley. Evidently it was not standard practice for NACA to allow contractors to conduct aerodynamic testing of their models at NACA, but an exception was made for Douglas in this instance.

The nacelle model, constructed at one-third scale, was tested in the wind tunnel at Cal Tech. The nacelle was complete with a propeller and a 300-horsepower electric motor and cowl flaps. A test series was conducted to obtain data not only on engine cooling but also on the overall drag of the nacelle design. According to Heinemann, the electric motor was mistakenly wired to produce 600 horsepower. The water demands to keep the motor cool during the tests created a water problem with the City of Pasadena so the test programme had to be completed at night.

As the design work continued, Douglas proposed a production schedule to the Air Corps. On 23 February 1941, less than a month after the proposal for the prototypes had been submitted, the company presented a bid on A-26 production to the contracting officer at Wright Field. This proposed the construction of 500 A-26s based upon the Douglas specifications contained in DS-538B, dated 25 March 1941 (some four weeks hence), for a total contract price of $71,123,809. This provided for a cost plus fixed-fee contract. The price per aircraft was $120,653; it also contained provisions for 10 per cent spare parts, a static test airframe, a model, parts lists, manuals, photographs and other miscellaneous data. The production cost

was $66,470,350, to which Douglas added a 7 per cent fee ($4,652,959) to reach the proposed contract total. The fee yielded Douglas $8,446 per aircraft delivered.[15]

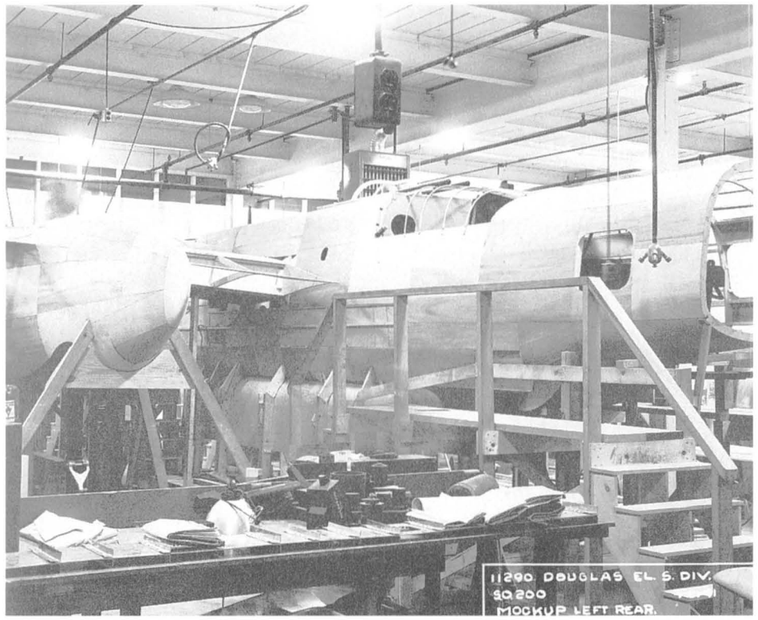
Douglas planned to produce the A-26s at its Santa Monica plant with deliveries to commence twenty months after the contract was signed. The 500th A-26 would be delivered approximately three years after production began. This initial production offer was not accepted by the Air Corps and a revised production proposal was resubmitted on 30 July; a contract was not finalized until 31 October. (It is interesting to note that there is no record of any consideration being given to the building of a production version of the XA-26A night fighter even at this early date. It is conceivable that the XA-26A was considered, from its inception, as a back-up for the Northrop P-61 programme.)

Despite the contract delays, Douglas continued design work on the new attack bomber and constructed full-sized mock-ups at El Segundo to work out equipment installations. In mid-April 1941 the mock-up of the XA-26 was inspected by several committees made up of Air Corps representatives from General Headquarters Air Force and the Material Division at Wright Field. They conducted two inspections, one between 11 and 16 April, and a second between 19 and 22 April. Representatives from the Royal Air Force also inspected the proposed bomber on 9 April and prepared their own report. The Air Corps had intended these inspections as preliminary because the mock-up was incomplete. However, Douglas requested that the Corps consider the evaluation as the final inspection so as to expedite progress. The power plant installation was not yet completed and arrangements were made for an inspection of that the following month. The available mock-up did not include the aft portion of the fuselage, the right wing or the outer portion of the left wing.

The mock-up was largely satisfactory but a number of comments and recommendations were made. One identified a problem that would plague the A-26 design for several years: a committee report noted cockpit visibility problems when viewing towards the right front of the aircraft and found that 'this visibility is very important when flying formation (the number three) position in airplanes having left side controls'. The proposed solution was to shorten the glare shield cowling over the instruments to allow a wider field of vision towards the right side of the cockpit; this proved to be wholly inadequate.[16]



The gunner's compartment looking from the bomb bay aft through the access hatch. The design for the periscope gunsight equipment included a significant piece of armour plating to protect the gunner. Boeing Historical Archives



An aft view of the mock-up showing the gunner's compartment, the bomb bay doors and the wing flaps. The two openings on the sides of the aft fuselage were provided for maintenance access but not incorporated into the prototype. Boeing Historical Archives

Other recommendations included the redesigning of the pilot's control wheel, the movement of some controls and switches in the cockpit, and provision of a seat for the bombardier in the nose section. The aircraft armament, which at this time consisted of two remote-controlled turrets and two fixed machine guns in the bombardier nose, was considered satisfactory. It was felt, however, that the .50 calibre gun mounts in the nose section should be modified to allow the installation of .30 calibre guns also, since the smaller guns were considered more effective against personnel in strafing attacks.

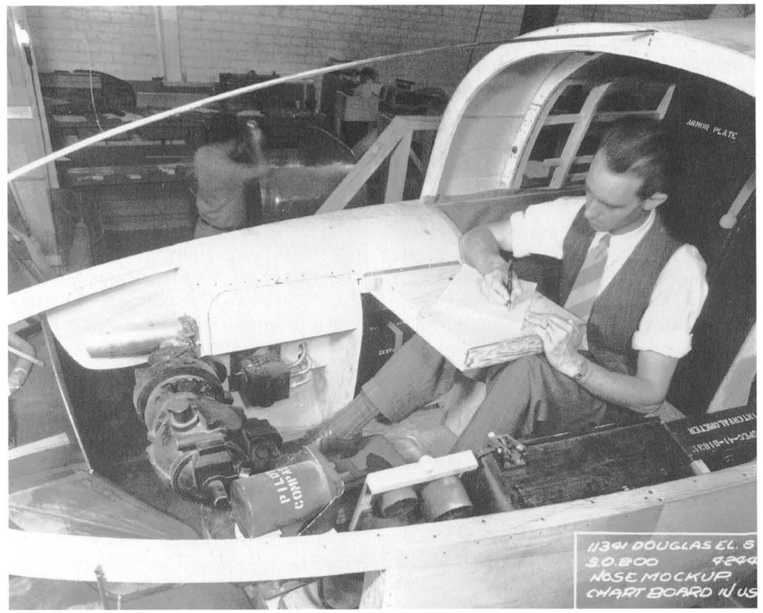
One report recommended that the A-26 crew should be increased in number to five: pilot, bombardier, navigator, radio operator/substitute gunner and rear gunner. It was suggested that the radio

operator and the navigator be added because of the tactical radius of the bomber.[17] Fortunately, given the changes required by doubling the crew positions, no further action was taken.

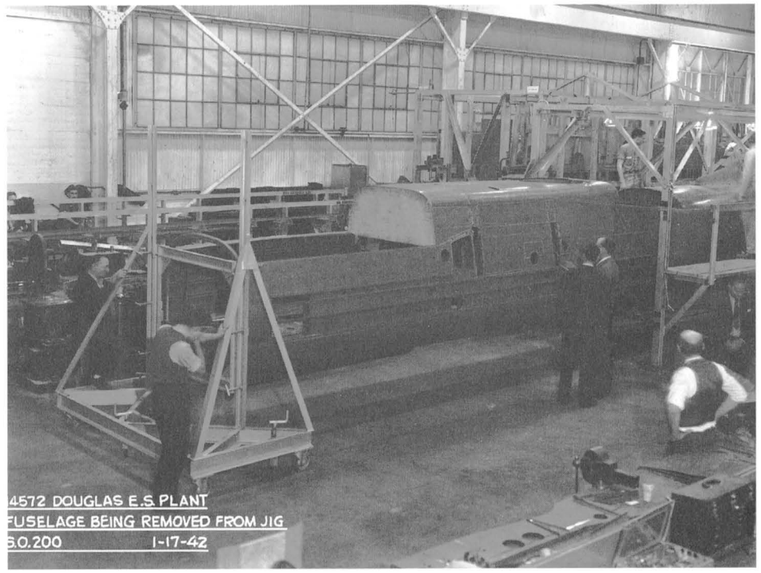
It was noted that Douglas had studied the installation of a 125gal (475ltr) auxiliary fuel tank (later reduced to 100gal [380ltr]) inboard of each engine nacelle. The normal fuel load for the airframe was still considered to be 440gal (1,670ltr); however, the main nacelle tanks also had their capacity increased by 80gal (300ltr) each by enlarging the tanks aft and extending the nacelle several inches. Thus each of the main tanks could actually hold 300gal (1,140ltr) of fuel. Combined with a new 250gal (950ltr) bomb bay tank (later reduced to 125gal [475ltr]), the maximum fuel capacity was now proposed to be 1,100gal (4,160ltr), versus the 690 (2,600ltr) of the original specification. Even with this weight of fuel, Douglas still expected the aircraft to carry 2,400lb (1,090kg) of bombs under the following conditions: 475mile (765km) tactical radius at 300mph (480km/h) while taking off at an overweight condition of 31,750lb (14,400kg) – this weight being 5,750lb (2,600kg) above its maximum design gross weight of 26,000lb (11,800kg). The wing loading in this configuration was 59lb/sq ft (288kg/sq m). The first production Martin B-26s, by way of comparison, offered a maximum wing loading of 53lb/sq ft (260kg/sq m) at an over-gross weight of 32,025lb (14,540kg).

Contract for the Prototypes

Satisfied with the mock-up and the finalized design, the Air Corps and Douglas finally completed a contract to build prototype aircraft of both the XA-26 attack bomber and the XA-26A night fighter. The contract was modified from the original Douglas proposal of $2.519 million to $2.208 million. The breakdown of the contract provided $1,220,849.91 to build the XA-26; $732,788.00 to build the XA-26A; and additional amounts for models and data. To reach the lower price the Air Corps agreed to pay a cost plus fixed fee amount, the Douglas fee being 6 per cent, or $125,003.15. Also deleted was the requirement for flight insurance for each of the aircraft at a cost of $120,000. Not included in the contracted price was government-furnished equipment (GFE) including engines, turrets, landing gear, instruments and other miscellaneous items. The contract, designated as AC-17946, was approved by the War Department on 2 June 1941, and provided for the first flight of the XA-26 by 15 January 1942. Army serial numbers 41-19504 and 41-19505 were assigned to the XA-26 and the XA-26A, respectively.



The bombardier nose section mock-up suggests a fairly tight fit. The small table folded down, allowing access to the bomb sight located forward. Two .50 calibre guns were to be installed on the right side of the compartment. Boeing Historical Archives



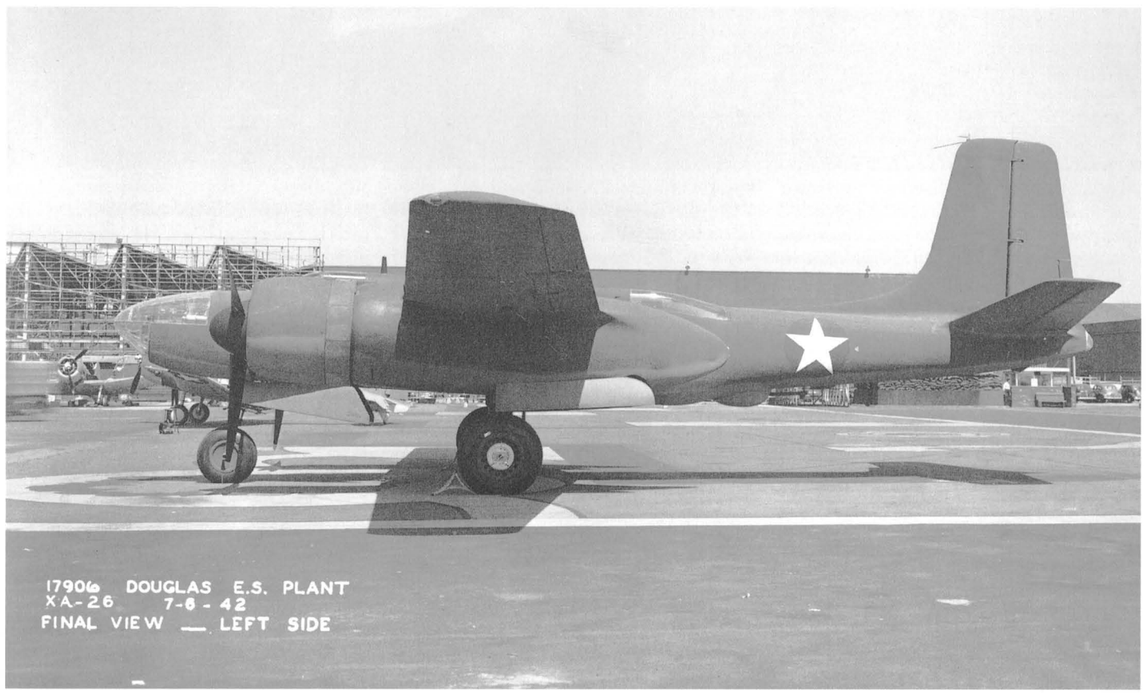
The completed fuselage of the prototype XA-26 coming out of the construction jig on January 17, 1942. The two vertical slots in the fuselage aft of the cockpit area are where the two wing spars were attached into the carry-through section in the bomb bay. Note the provisions for the upper turret and the long 'tunnel' on the side of the fuselage for the installation of hydraulic lines and electrical wiring. Boeing Historical Archives

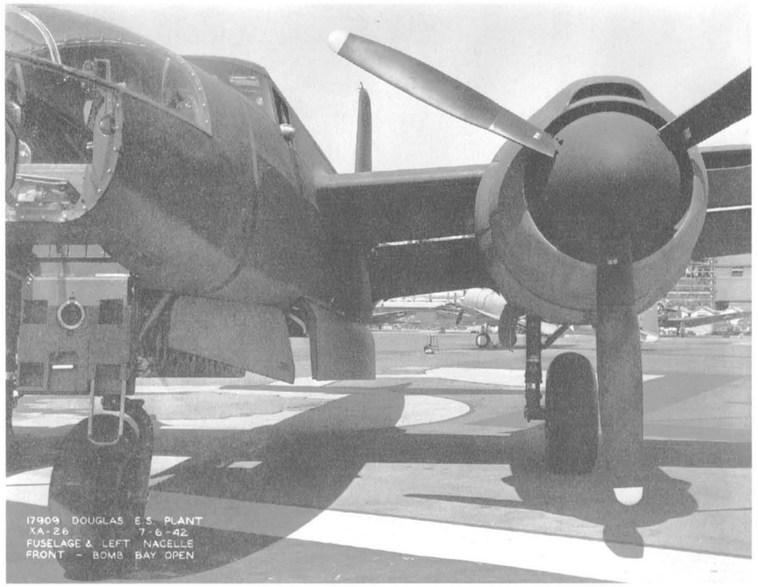
The three aircraft were processed into the construction schedule at the El Segundo facility and assigned the manufacturer serial numbers of 1004, 1005 and 1006 by Douglas. The summer of 1941 was busy at El Segundo. Still five months before the attack at Pearl Harbor the engineering section was furiously working up drawings for the XA-26, SB2D and changes to the A-20 and the SBD. On the production line, Douglas was delivering SBD-3s, Army A-24s and DB-7 bombers. A-20 fuselages were also being built and trucked to the Santa Monica plant for final assembly. For the A-26 programme, drawings were finalized, aluminium was cut and forgings cast for the three prototypes.

Discussions with Douglas began in August 1941 to produce an alternate gun nose for the XA-26B that included four 37mm cannon instead of the single 75mm one. This version was tentatively assigned the designation of XA-26C. The specifications proposed the installation of four X-9 or M-4 37mm cannon with continuous feed magazines and thirty-two rounds per gun. The guns were to be manually charged and loaded by means of mechanical handles, but fired electrically by the pilot. Provisions were made to install an AGL-4 radar-receiving unit with a non-metallic cover above the cannon with the radar transmitter installed in the aft section of the nose or in the cockpit. By April 1942 Douglas had made a specific proposal to the Air Corps to proceed with development of this alternate nose installation, including the construction of a gun nose for mounting and test firings on a test stand.

Negotiations for production of the A-26 continued. On 16 June 1941 Douglas provided the Air Corps with a revised specification, designated as DS-539, for production aircraft. On 28 June the contracting officer at Wright Field requested a new proposal from Douglas for the production of 500 A-26s. Douglas responded with a bid on 7 July that

The completed XA-26 prototype on the ramp at El Segundo on June 6, 1942, four days before its first flight. This prototype was finished in the standard AAF camouflage and markings of the day. The size of the engine nacelles and how they obstruct the pilot's vision is quite apparent from this view. Boeing Historical Archives





Another view of the XA-26 at El Segundo, this one showing the propeller and spinner installation. The spinners were deleted on production aircraft, reportedly due to engine cooling problems. Note the open access hatch for the bombardier compartment with the step that extended downward. The only significant external changes from the later A-26Cs were the revised canopy and the provision of wing guns and weapons. Boeing Historical Archives

evidently did not satisfy the Air Corps Material Division due to confusion about the specifications. The Air Corps requested another revised bid.

On 30 July Douglas submitted a new bid to build 500 A-26s for the Air Corps. The proposal was a cost plus fixed-fee agreement and again included the construction of 500 aircraft, 10 per cent spare parts, drawings, data and a static airframe. The production aircraft would be built with provisions to carry torpedoes; at this point the A-26 production version would have the bombardier nose mounted as in the XA-26. The unit cost per A-26 was proposed at $134,0370 and the total contract cost was $73,834,950. To this amount Douglas added a 6 per cent fee, or $4,430,097 ($8,860 per aircraft). Douglas proposed that, if the contract were approved by 15 August the first production aircraft would be delivered in January 1943, with the rate increasing to fifty aircraft per month by September 1943, and the 500th A-26 to be delivered in March 1944.[18]

The Air Corps accepted this proposal in its entirety, though it took nearly three months to finalize. The contract, designated AC-21393, was approved on 31 October 1941, still five weeks before the attack on Pearl Harbor and months before the three prototypes would see the light of day. The production aircraft were designated as 'A-26' and assigned a serial block between 41-39100 and 41-39599. Of interest also is that another serial block was initially assigned to the first 500 A-26 aircraft, one between 42-11754 and 42-12253. It is possible that because the aircraft were actually ordered in Fiscal Year (FY) 1942 (which began in July 1941) a new serial allocation was reserved; however, the earlier FY 1941 allocation instead remained assigned to the aircraft.

In a document of October 1941 supporting the acceptance of the contract, the Air Corps Material Division provided the unit cost of several Corps aircraft in production as compared to the proposed $134,037 unit price of the A-26. It was found that the price of the Douglas A-20B was $96,000; the Martin B-26, $131,000; and the Boeing B-17, $245,000. (It should be noted, however, that these prices are all less the government-furnished equipment that added considerably to the actual production costs.) The Material Division concluded that the cost of the A-26 was fair and reasonable when compared to the A-20 and the B-26.

New Plants

The Douglas Aircraft Co., meanwhile, was beginning construction of a new plant at the nearby Long Beach Municipal Airport, approximately 15miles (24km) south-east of the El Segundo facility. In May 1940 President Roosevelt had called for the construction of 50,000 aeroplanes for the impending war, and both the expansion of existing plants and the construction of new facilities were under way around the country. The national goal was to create a production capacity of up to 40,000 aircraft per year by 1942. The Long Beach plant was built under the provisions of one expansion programme that allowed companies to borrow money from the federal Defense Plant Corp., build and equip a plant and have the government then make annual payments for five years to purchase the facility. After the five- year period was over the federal government would gain title to the plant. This programme allowed aircraft manufacturers to build needed plants without risking any over-capacity after the war emergency ended.[19]

The Long Beach plant was originally constructed to build C-47 transports. Douglas organized a wholly-owned subsidiary, the Western Land Improvement Co., to build the new plant on the north side of the Long Beach airport. Construction was completed in November 1941 and the first C-47 rolled from the new plant on 23 December. Before the war ended Douglas would build C-47s, B-17s and A-26s at Long Beach. After the war it reverted to the federal government, but Douglas subsequently purchased most of the facility for post-war production.[20]

In November 1940 the Army Air Forces (AAF) also decided that new bomber production plants would be built and, to provide a measure of protection, they would be built in the interior. Part of this production plan called for the Ford Motor Co. to operate a huge new B-24 facility at Willow Run, Michigan, that would, besides assembling complete B-24s, also produce the components for an additional



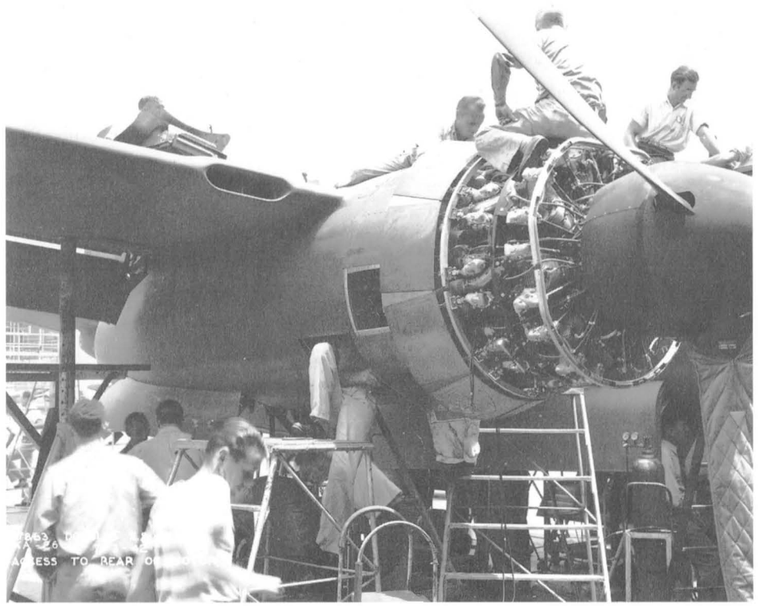
The XA-26 is shown here rolled up to a hangar for finishing work at El Segundo on 6 July 1942. The gunsight has not been installed and it appears that the workers on top of the fuselage are installing a cover over the top turret opening. The lower turret appears to be installed. Boeing Historical Archives

hundred B-24s per month. Half of these 'knock-down' kits, as they were called, would be transported to a new plant at Tulsa, Oklahoma, where Douglas would operate a production line that assembled fifty B-24s per month. These numbers were substantially increased later to meet the demands for heavy bombers.[21]

The plant at Tulsa was one of the aircraft production facilities built under the jurisdiction of the Defense Plant Corp., and the city of Tulsa, eager to attract the huge factory, supplied a site located adjacent to the municipal airport. Fifteen million dollars were earmarked to construct the plant, with ground breaking occurring in May 1941. Besides B-24 assembly, A-24 and the A-26 production were also assigned to Tulsa. The plant shut down in 1945, with the end of the war, and was used for storage until 1950. It became known as Air Force Plant 3 when it was reactivated for Douglas to manufacturer Boeing B-47s under licence beginning in 1950. Douglas, by then operating as the McDonnell-Douglas Corp., terminated its lease of the facility in 1994. In 1999 the federal government released its interest in the facility and title was turned over to the city of Tulsa.

Prototype Problems

As the three prototype A-26s were constructed at the El Segundo plant in early 1942, delays began to surface, primarily due to slow deliveries of the government-furnished equipment for the prototypes. Given the emergency that occurred after 7 December 1941, it is understandable that delays did occur. The XA-26 was scheduled to make its first flight on 15 January 1942, a date set in June 1941 when contract AC-17946 was signed. This date was undoubtedly optimistic and the scheduled delivery of government-furnished equipment was critical to keeping the programme on time. One crucial requirement was that the landing gear struts should be available for the XA-26 no later than 15 December 1941. However, after a series of promises of delivery it was determined that the required struts



Engine work under way at El Segundo on 3 July 1942. This view shows to good effect how the spinner met the R-2800 engine case cover to direct air to the engine cylinders. However, in testing it was revealed that the tightly-cowled engine and the spinner assembly did not provide enough airflow to cool the engine properly and the spinner assembly was deleted. Note the mechanic working inside the nacelle on engine accessories. The aircraft is one week away from its first flight in this view, the number of workers around it indicating the priority it was receiving. Boeing Historical Archives



First flight of the XA-26 was made by the famous pilot Benny Howard on 10 July 1942, from Mines Field. Howard was said to have remarked after the flight that the aircraft was ready for production 'Right now, just as it is!' Boeing Historical Archives

would not be delivered before June 1942 and the proposed first flight was moved back to 1 July.[22]

On 8 September 1941 Douglas informed the Air Corps Material Center that the two General Electric remote gun turrets, also government-furnished, would need to be delivered to El Segundo no later than 15 January 1942 in order for the proper engineering to be completed for the installation. Final drawings for the engineers did not arrive until May 1942 and only the lower turret was evidently available when the XA-26 first flew two months later. Delays were also experienced in the arrival of self-sealing fuel tanks, engines, propellers and propeller spinners. The schedule slippage for the A-26 programme, to become a major headache for both Douglas and the Air Corps in the subsequent three years, thus began.

Particular attention was being paid by the Wright Field production engineering section to the development of the XA-26B 75mm cannon installation. Douglas had mocked-up a prototype nose section with the cannon installation by the spring of 1942 and completed test firings with impressive results. With the war being fought on all fronts in its first months, firepower became all-important. Wright Field began considering the installation of the cannon nose on some or all of the 500 A-26s under the first production contract. A teletype message on 9 May 1942, from Wright Field to higher Washington staff offered:

> 1. If it is desired to obtain the 75mm nose cannon installation for tank destroyer missions, it is believed this version could be obtained in all or part of the 500 airplanes now on contract without delay in delivery as an alternate to the present medium bomber version. However, it will be necessary to discuss this matter with the contractor before definite information on this point can be furnished.
> 2. The above 75mm nose cannon would not of necessity incorporate the rangefinder [that is, radar] sight for airplane destroyer missions as provided in the XA-26B but would retain the bomb bay installation with bomb release control located in the pilot's compartment for operation by either the pilot or the nose gunner, this providing a low-altitude bomber version in combination with the tank destroyer version. A bombsight would not be provided, but an intervalometer might be provided.
> 3. Due to the weight of the nose cannon, the maximum bomb load which could be carried with the full built-in fuel capacity of 800 gallons [3,030ltr] would be not over 3000 lbs [1,360kg] as compared with 4,000 lbs [1,820kg] for the present bomber version. The range with 800 gallons of gas at 32,000-lbs gross weight [14,500kg] (maximum permissible overload weight) is about 1,400 miles [2,250km].
> 4. A .50 caliber gun nose is being considered as an alternate to the 75mm cannon nose for ground attack missions, though no action has been taken with the contractor in this matter other than informal discussions. Such a .50 caliber nose would have the maximum number of guns possible with the optimum number of rounds of ammunition per gun. It is believed that either four or six guns could be provided with 500 or 600 rounds per gun.[23]



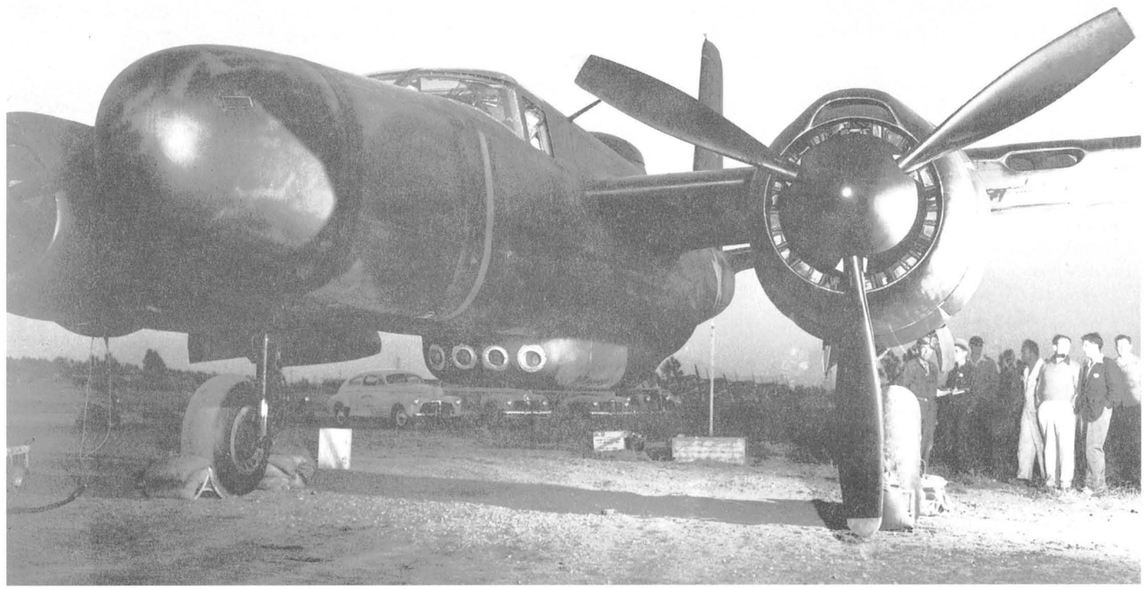
This view shows the XA-26A prototype in final assembly outdoors at the El Segundo factory on 29 July 1942. Just out of view behind the XA-26A is the XA-26B also in final assembly. That both aircraft were finished outdoors is a testament to the Californian weather and the lack of floor space in the factory. Boeing Historical Archives

The same teletype also noted that '... the basic A-26 airplane is a highly versatile weapon due to its adaptability to various combat versions including the airplane destroyer and night fighter versions already under development ...'

On 18 May 1942 personnel from the production engineering and experimental engineering sections at Wright Field inspected the XA-26 nearing completion at El Segundo. The team reviewed the bombing equipment installation on the prototype and also viewed test firings of the 75mm cannon installed in the proposed XA-26B nose section. At the time of the inspection the XA-26 was expected to complete its first flight the following month, with the XA-26A following in September 1942 and the XA-26B in October.

However, in May 1942 Douglas also advised the AAF Materiel Center at Wright Field that the first aircraft delivery for the production contract of 500 A-26s, scheduled for January 1943, would have to be slipped at least five and a half months. This was attributed to the accumulating delays incurred in the construction of the prototype XA-26, and Douglas requested that the Materiel Center recognize reality and issue a change order with a revised production schedule. The Center responded the following month with an acknowledgment that, while delays in the





Opposite top: **The completed XA-26A in July 1943 after being accepted by the AAF. The aircraft was finished in overall black and, like the two other Invader prototypes, had the wrong AAF serial numbers applied. In what can only be a gross oversight by Douglas quality control, all three Invaders had the wrong fiscal year used for in their displayed serials. The XA-26A should have been marked with the serial 119505.**
Boeing Historical Archives

Opposite bottom: **Good view of the 20mm cannon package in the belly of the XA-26A. The nose gear has been retracted for a series of firing tests conducted at a ballistics range set up at Mines Field. By the time these were conducted in July 1943, the night-fighter version of the Invader was not being considered for production with the more capable P-61 Black Widow already on the Northrop assembly line at nearby Hawthorne airport.**
Boeing Historical Archives

XA-26 were largely due to late deliveries of government-furnished equipment, the vital need for the A-26 required that Douglas should absorb programme delays and refused to modify the original production schedule.

As approved, AC-21393 provided for the construction of the medium-altitude bomber version of the A-26, that is, with the bombardier nose. Through the early months of 1942, as the USA was reeling from setbacks on every combat front, several proposals were progressing to change the armament installation. In June 1942 there were at least four different nose sections under consideration for A-26 production, not counting the radar nose section of the XA-26A. The bombardier nose was already engineered and installed on the XA-26. The 75mm cannon installation, originally envisioned for the XA-26B aeroplane destroyer, was now being considered for use as a tank destroyer. An alternate nose with four 37mm cannon was also under development for a new version with a preliminary designation as the XA-26C. Finally, Douglas was informally being asked to consider the development of a nose section with either four or six .50 calibre machine guns.

The production engineering section (PES) at Wright Field saw the potential in the basic A-26 design for seven possible versions of the model:

a. Medium-altitude bomber with bombardier in a conventional manner.
b. Tank destroyer and ground-attack version with 75mm cannon in the nose operated by a gunner with the bombing installation operated by the pilot for low-altitude bombing.
c. Airplane destroyer version with 75mm nose cannon with either telescopic or radar sighting. As developed, the XA-26B configuration did not have provisions to carry bombs due to radio and radar installations; however, it appeared that the final configuration would allow bombs with some radar equipment moved to the nose section.
d. Tank destroyer and ground attack version with four 37mm high velocity cannon in the nose instead of a 75mm cannon.
e. Ground attack version with a six .50 caliber gun nose and pilot-operated bomb equipment for low altitude bombing.
f. Night fighter version equipped with radar.
g. Photographic or reconnaissance version with long-range fuel tanks.[24]

On 9 June 1942 the PES prepared a report that recommended that the A-26 production contract should be changed to specify delivery of as many of the 500 A-26s as possible with the 75mm cannon installed. As an alternative to disrupting the production schedule, it was proposed that each of the A-26s on the contract should be delivered with three noses: a 75mm cannon nose, a bomber nose and a six .50 calibre gun nose. It was expected that each of the noses could be changed in less than 24h and, with some additional minor configuration changes, would provide for a versatile aircraft. The PES acknowledged that the first 500 A-26s could not have provisions to carry radar gunsights for the 75mm cannon, due to the unavailability of specific design information about the new units, but that radar sights could be added to later production aircraft. As a result of the

Displaying only a family resemblance to the other two prototypes, the elongated radar nose of the XA-26A, the cannon package and the night camouflage added a menacing look to the lines of the Invader.
Boeing Historical Archives





This view shows the XA-26B in final assembly at El Segundo in July 1942. The primary difference between the XA-26 and the XA-26B was the installation of the 75mm cannon on the right side of the cockpit extending forward through the gun nose. Boeing Historical Archives

report, Douglas were asked to prepare proposals for contract changes. The 9 June report also noted that:

> … the engineering on this airplane is being accomplished at the El Segundo plant … although the airplane will be built at the Santa Monica plant. The El Segundo plant is now very busy with certain Navy projects and is considered basically a Navy plant. Therefore if the need for A-26 airplanes, particularly the tank destroyer version, is deemed sufficiently urgent to warrant an increase in engineering schedules over those now in effect, it may be necessary to require the Contractor to transfer engineering personnel from Navy work for a period of time in order to accomplish the desired speed-up in engineering schedules …[25]

It was apparent that the engineering section at El Segundo was stretched to the limit and could not provide the level of support the AAF was requiring for the numerous changes in specifications being considered for the A-26.

XA-26

The XA-26 was completed in early July 1942. It struck a formidable pose on the ramp at the El Segundo plant as preparations were made for its first flight. The sleek Invader featured a high-wing design with the two huge nacelles dominating the wing. The Pratt & Whitney R-2800-27 engines drove three-bladed Hamilton Standard propellers, their hubs hidden within large spinners that mated to airflow baffles on the engine's front case. Provisions for low- profile turrets were located both dorsally and ventrally on the fuselage midsection. The long bomb bay was designed to accommodate torpedoes as well as bombs. The XA-26 was completed as a mid-altitude bomber version and thus featured the bombardier nose. The aeroplane was finished in the standard olive drab and grey camouflage but, besides red propeller warning stripes on each side of the cockpit, and AAF insignia was devoid of markings.

The first flight of the XA-26 was accomplished on 10 July 1942, when the famous test and race pilot Benny Howard flew the bomber from the runway at Mines Field. When Howard brought it back to the ramp at the Douglas facility, he was reported to have enthusiastically said that the aircraft was ready for production 'right now, just as it is!' As Douglas pilots were not well versed in the low-level flying expected as the mission for the A-26, many experienced Air Corps aviators were allowed to fly it for evaluation. (The official reason sounds plausible, though the opportunity to fly a new attack bomber at very low altitude may have also been appealing to Air Corps pilots.) Among those was Col Stan Umstead, better known for his involvement in the early B-17 programme. Heinemann recalled that Umstead roared out of Los Angeles and 'never once got above 100 feet [30m]' as he dashed across southern California to

The completed XA-26B shortly before acceptance by the AAF in June 1943. The aeroplane was utilized for a number of armament installations, as evidenced by the patches on the gun nose. The airframe itself appears to be finished only in a primer coat with no camouflage paint added, save that on the gun nose and engine cowlings. Boeing Historical Archives





A side view of the XA-26B, also taken in May 1943 at Mines Field. Note the unpainted cowl flaps, the incorrectly applied AAF serial number and the lack of camouflage paint on the fuselage and wings. Boeing Historical Archives

perform his evaluation. Heinemann recalled that his only comment after landing was that there was 'not a thing wrong with this airplane'.[26] Douglas and the Air Corps were both excited with the results.

The prototype was quickly put through a rigorous evaluation. At some point the Army-assigned serial number was painted on the aeroplane, leading to a mystery that has yet to be solved. Inexplicably, the serial number was applied as 219504, corresponding to an assigned serial of FY 42-19504. The correct serial number was 41-19504. This same mistake was also made on the two sister prototypes, the XA-26A and the XA-26B. These numbers remained painted incorrectly on the aircraft through most of their military service. Several explanations, usually citing security reasons, have been offered but do not make much sense. It would appear that whoever applied the markings originally got them wrong and the mistakes were either never noticed or never corrected.

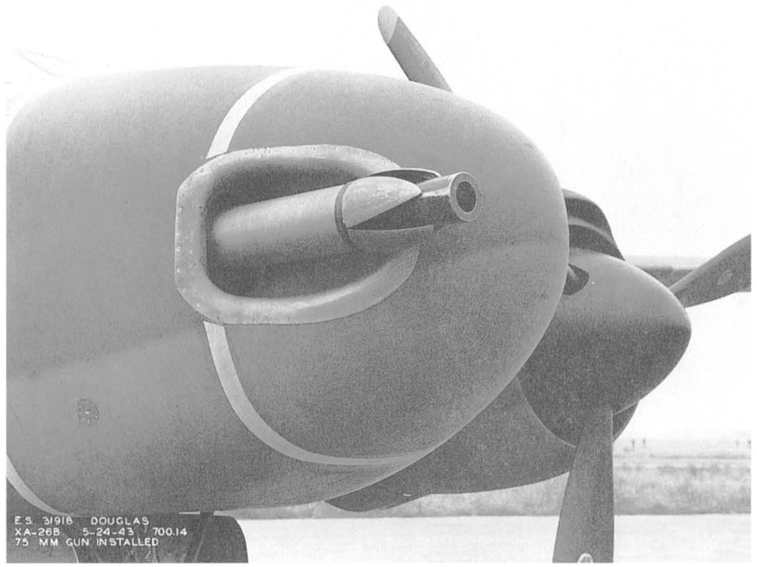
At some point, probably in 1943, the outboard sections of the cowlings were painted bright yellow to make the aircraft more visible from the air. Douglas continued to use it, presumably to work out design modifications, since the AAF did not officially accept the XA-26 until 21 February 1944. At that time it was flown to Wright Field for additional testing. In December 1944 the prototype was assigned to Minneapolis for autopilot work with Honeywell, remaining there until the end of the year. In January 1945 it was assigned briefly back to Wright Field and then to the San Bernardino Air Depot in California, probably for overhaul. In April 1945 the XA-26 was assigned to Muroc AAF (now Edwards AFB), possibly for a test programme. In any event, it was surveyed in May 1945 and, without fanfare, scrapped on site.

XA-26A

The XA-26A was the night-fighter version of the Invader, of which only one example was built. As noted elsewhere, the XA-26A featured four 20mm cannon installed in a package below the bomb bay. Ammunition for the guns was carried in the bay above the guns. A smaller bomb bay aft of the cannon allowed up to 2,000lb (910kg) of ordinance to be carried. The lower gun turret of the XA-26 was deleted and the upper turret armament was increased to four .50 calibre guns. The nose section was elongated by more than 1.5ft (46cm) and contained the MIT-developed AI-4 airborne intercept radar. The armament and capability of the XA-26A were similar to those of the Northrop P-61 design being developed at nearby Hawthorne, California. The success of the latter design made the requirements for the XA-26A redundant.

The XA-26A carried a two-man crew: pilot and the radar operator/gunner. Mock-ups and design drawings for the model show the radar operator position in the nose just aft of the radar unit, with a teardrop bubble canopy providing visibility. On the prototype it appears that the Plexiglas canopy was deleted, but the radar operator retained his position in the nose compartment. Other design specifications were similar to those of the XA-26, though the aircraft appears to have been finished in the flat black, night camouflage scheme with the incorrect Army serial 219505 carried on the tail.

Few details have come to light about the XA-26A programme. Armament testing was under way at Mines Field in July 1943, with photographs of the



This detailed view shows one proposed installation of the 75mm cannon, extending through a protective sheath and special fairing on the gun nose. The sheath was later discarded as unneeded. At this point, in May 1943, there were no additional guns installed in the nose section. The XA-26B was accepted by the AAF on 30 June 1943. However, its use was short-lived since it was written off less than three months later, on 21 October, possibly after an accident. Boeing Historical Archives

aircraft test firing its cannon statically at a gunnery range. The AAF did not accept the airplane until September 1943. The date of its first flight and of other tests are unknown, nor has information about whether the AI-4 radar was ever installed or tested on the model. It was initially assigned to Wright Field, remaining there until March 1944. At that time it was sent to Wendover AAF, Utah and then, in December 1944, to Eglin Field, Florida. What role, if any, it played at Eglin remains unknown; it was salvaged in January 1945 and dropped from the inventory.

XA-26B

The XA-26B was the attack version of the design and was built with a 75mm cannon installed on the right-hand side of the nose. Apart from the nose compartment, however, the XA-26B was nearly identical in configuration to the XA-26, including the prop spinners. Early views of the prototype show the single cannon installed in the nose section as the only nose armament, the cannon being protected by a metal sheath that evidently opened during the firing process to expose the cannon's muzzle. The nose design was similar to that produced with the first fifteen production A-26Bs.

Details concerning the test programme conducted with the XA-26B are unavailable. The AAF accepted the aircraft on 30 June 1943 and it was flown direct to Eglin Field, presumably for additional testing at the AAF proving grounds. Its service life was short, however, as it was written off on 21 October 1943. Whether it was destroyed by an accident or deemed excess to requirements has not been determined.

XA-26C

The XA-26C programme to install four 37mm cannon in place of the 75mm cannon in the nose section progressed through the design process. The programme was terminated after the development of the all-purpose nose and the designation was cancelled. The designation of A-26C was later applied to the mid-altitude bomber version of the Invader.[27]

CHAPTER THREE

Development and Production

Design Modifications

As the flight test programme for the prototype XA-26 got under way in the summer of 1942, efforts accelerated to get the aeroplane into mass production. The AAF recognized that it had a potent weapon in the Invader and wanted it as soon as possible for combat units. Unfortunately, the following year saw significant difficulties with engineering, tooling and AAF decisions about the aeroplane's configuration that delayed deployment of the A-26 in significant numbers until the late fall of 1944.

The AAF continued to modify the armament requirements for the production A-26s. On 18 July 1942 a change order was issued on the contract to deliver the 500 production aircraft with the 75mm cannon nose installed. A month later Douglas was informed that all the bomber noses proposed for the A-26 were henceforth cancelled, but that Douglas was to produce 200 machine gun noses equipped with six .50 calibre guns for an alternate installation to the cannon noses.

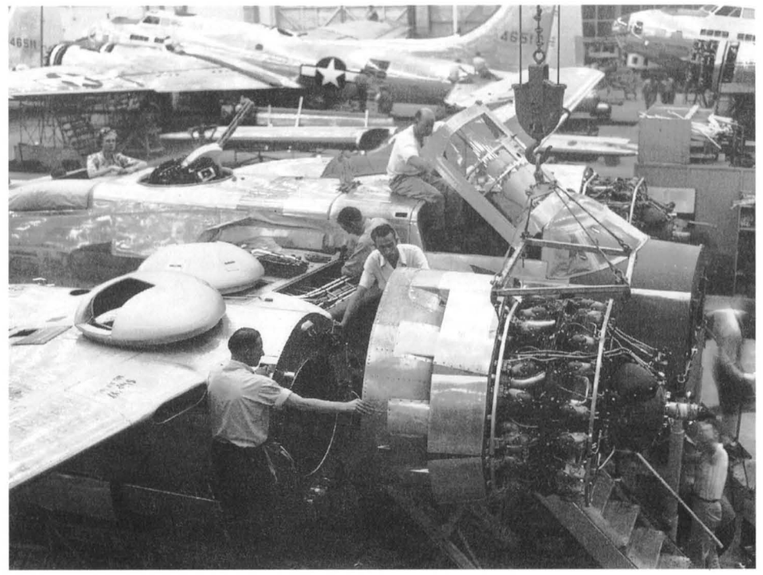
After reviewing some of the flight and operational testing data on the XA-26, the AAF Production Engineering Section (PES) directed that a number of changes be made in the design for the production aircraft. While most were minor, one item noted was a request for the redesign of the engine cowlings to simplify assembly and removal, making it possible for one man to do the job instead of the two required on the prototype design. Other items provided for winterization of the aeroplane, small equipment replacements and electrical changes. There was another item of concern: the tunnels built down each side of the aircraft for installation of wiring and hydraulics, while ideal for aircraft maintenance, were considered vulnerable to combat damage and consideration was requested to design better protection for those areas.[28]

On 31 October 1942 the PES was projecting that first deliveries on the A-26 contract would occur in June 1943 but that 'every effort will be made to better this date by at least two months if possible. The first six airplanes will be built with the XA-26 prototype tooling as a means of expediting this program.'[29] In early 1943 a decision was made to shift production from Santa Monica to Long Beach and the new bomber plant at Tulsa.

Engineering delays continued to plague the programme. On 18 November 1942 Douglas responded to an AAF request outlining its engineering assignments to the several military aircraft being built by Douglas, including the B-17F, the SBD, the SB2D, the C-47 and the C-74, as well as the A-26. The AAF Materiel Center was not satisfied with the assignment of engineers to the programmes and, on 4 December, directed Douglas to transfer two-thirds of the C-74 engineers to the A-26 programme. The AAF considered it absolutely essential that five A-26s be delivered in June 1943, with a steady increase in monthly deliveries to sustain, eventually, a rate of 500 A-26s per month. This was still before additional A-26s had formally been placed under contract, though the contract proposals were written for a follow-on contract for the original 500 A-26s.[30]

Furthermore, all engineering work on the A-26 that was developing anything except the 75mm cannon nose was to be curtailed until that was completed. Once the cannon nose was finished, work was to continue in the following order: finish engineering on the bomber nose; design under-wing removable gun racks to allow

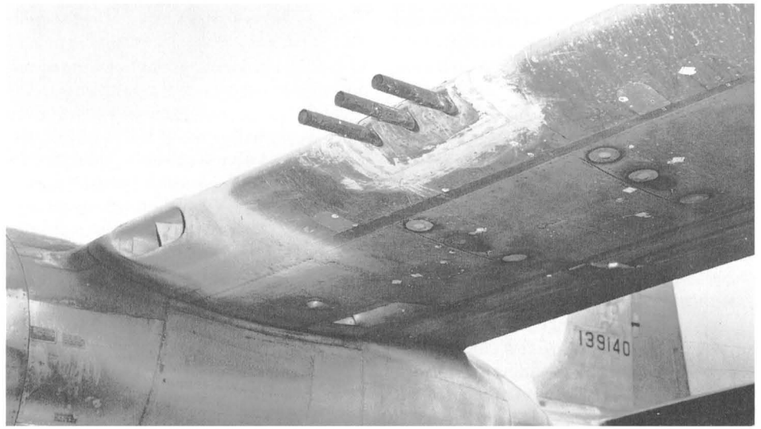
Production got under way at Long Beach in the fall of 1943, though only seven aircraft were actually delivered that year. By mid-1944, however, the assembly line output had increased significantly. This view in August 1944 shows early A-26Bs being built on the line alongside Douglas-built B-17s. The early-style canopy hatch was not replaced on the Long Beach line until October 1944. Boeing Historical Archives





Left: **One of the early changes to the A-26 design was the provision to install two pairs of .50 calibre guns in pods under each wing. The guns were fed from ammunition boxes installed within the wings. Wiring was built into the wings that terminated at threaded connections on the under-wing surface. Hard points for the gun attachment fittings were also provided. The pods added eight more guns to the but slowed the top speed by as much as 25mph (40km/h). Internal wing guns were soon on the drawing board.** Boeing Historical Archives

Below: **Early modification to test the installation of internal wing guns was undertaken at El Segundo. The trio of .50 calibre guns in each wing was incorporated on the assembly line in early 1945.** Boeing Historical Archives



for the installation of eight .50 calibre wing guns; a package of two 37mm cannon installed in a removable unit mounted below the bomb bay; the six .50 calibre machine gun nose; and the four 37mm cannon nose. The same document contradicted itself by specifying that under-wing gun packages were to be developed immediately to supplement the 75mm cannon on the A-26. If this were not possible, the AAF wanted two .50 calibre guns mounted on the left side of the 75mm cannon in the nose section. The Douglas response to the confusing and continually changing instructions from the AAF is not recorded. However, the emphasis remained that the production aircraft were all to be equipped with the 75mm cannon nose.[31]

Less than four weeks later, the Materiel Command revised the priorities for the development of the A-26 armament. It specified that the priority would be firmly set to engineer three nose sections: the 75mm cannon nose, preferably with two .50 calibre machine guns installed also; the six .50 gun nose; and the bomber nose equipped with two .50 calibre guns. Also, all production aircraft were to be standardized with bomb controls in the cockpit, provisions for torpedo director and releases, for installation of the N-3A low-altitude bomb/gun sight; and for the installation of two packages of twin .50 calibre guns under each wing. In addition, production A-26s would be equipped with the Honeywell C-1 autopilot. The PES also directed that a study should be made on designing the twin 37mm 'bathtub' package for installation beneath the bomb bay; however, it was noted that experiments with a similar installation on an A-20 were not satisfactory. The memorandum specified that the first 500 aircraft would be delivered with the 75mm cannon nose; subsequent deliveries would be in the following ratio: one 75mm cannon nose for each eight bomber-nose versions and gun-nose versions.[32]

In January 1943 the A-26 programme was at least six months behind schedule and slipping quickly. The prototype contract called for all three prototypes to have flown months earlier. The XA-26 had been flying for six months and provided invaluable engineering and operational data, but the XA-26A night fighter version was not yet completed. The radar unit was not installed in the airframe and would not be until after basic flight test data was gained (if then). The XA-26B also had not flown, but efforts were accelerating to complete the aeroplane so that airborne tests of the 75mm cannon nose could be completed. The radar sighting equipment also would not be installed on this airframe until later in the test programme. Production aircraft, the first of which was originally scheduled to be delivered in January, had not progressed down the assembly line and were slowly being hand-built at Long Beach by using the XA-26 prototype tooling. Production tooling had become, in fact, the major delaying factor in putting the assembly line into action.

On 11 January 1943 Douglas informed the Material Center by letter that it would be impossible to meet the schedule called for in the original production contract. Douglas relayed that the delays were no longer being caused by engineering work but by the inability to obtain tooling and factory development. The first delivery, already delayed from January and now scheduled for July 1943, could not be expected until October for production from Long Beach. The contract for an additional 500 A-26s, not yet approved, to be produced at the new plant at Tulsa, Oklahoma, would not see deliveries begin until January 1944.[33] The Materiel Center concurred with the revised delivery schedule.

On 19 January the AAF Materiel Division advised Douglas that henceforth the aircraft being built on contract AC-21393 would have their designation changed from 'A-26' to 'A-26B' and that a block system would be established. The engineering order noted that the first aircraft rolling from the A-26 production line would be designated as A-26B-1-DO (the 'DO' indicating a product of the Santa Monica plant). Actually, the aircraft built at Long Beach would be A-26B-1-DL, the 'DL' indicating production from the Long Beach plant. Those A-26s built at the Tulsa plant would carry a 'DT' suffix in the block designation.

Douglas engineers, no doubt confused and frustrated by the continued changes to the basic A-26, developed an all-purpose nose design that accommodated the installation of several configurations of weapons. In its first form, these included: six .50 calibre guns; four .50 calibre guns and one 37mm cannon; two 37mm cannons; or two .50 calibre guns and one 75mm cannon. This appeared to be the best way to settle the production configuration of the nose armament. Though the AAF continued to set the priority for the A-26 production with the purpose-built 75mm nose installed on the first 500 aircraft, the all-purpose nose obviously had significant advantages. The development of the four 37mm cannon nose was shelved, and with it the proposed XA-26C project.

On 22 February 1943 the AAF revised its contract specifications again, based upon the development of the all-purpose nose. The aircraft delivered with the new nose were to be designated as A-26Bs. Those delivered with the bomber nose, in which the AAF was once again interested, were to be designated as A-26Cs. The old XA-26C designation,

A view of late A-26B production at Long Beach taken on 27 July 1945. Many of the last A-26Bs built were earmarked for the Fifth and the Seventh Air Force operating from bases on Okinawa. In what could be termed a 'General Kenney Special', these A-26s had their lower turrets deleted and replaced with an additional 125gal (473ltr) fuel tank. They were delivered in an overall olive drab camouflage scheme and all were equipped with the eight-gun noses, six internal wing guns and provisions to carry external fuel tanks and/or rockets. Boeing Historical Archives



once applied to the 37mm cannon version, was now dropped. The AAF now wanted the 500 A-26s on the first production contract delivered from Long Beach as A-26Bs. The second 500 A-26s on contract AC-34443, not yet approved, were to be built at Tulsa and delivered half as A-26Bs and half as A-26Cs. As for the armament decisions for the A-26Bs, the memorandum directed that:

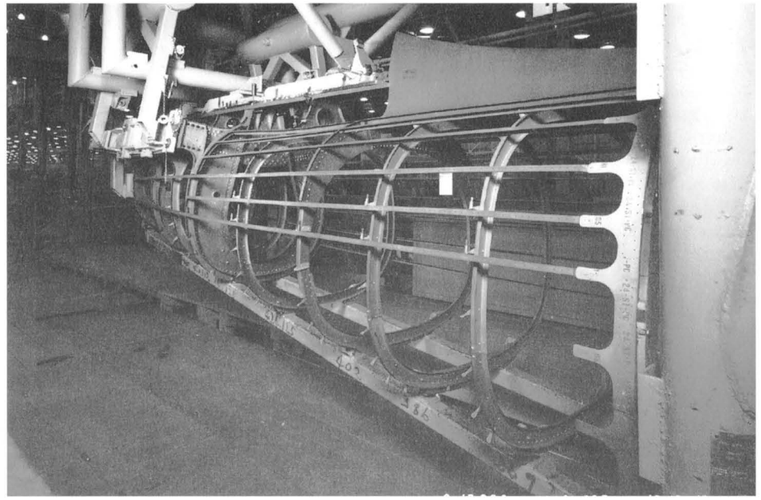
> in consideration of the fact that the all-purpose gun nose will provide for 37mm fire power, and in view of the ready interchangeability of the various armament configurations in the all-purpose gun nose, it is considered that a requirement for delivery of airplanes from the factory embodying the various armament configurations in various ratios will be established at a later date. This will depend upon the point at which the all-purpose gun nose becomes available in the production line and upon satisfactory operation of the various armament arrangements.[34]

References to delivery of aircraft with the 75mm cannon installed began to fade.

At around the same time, the AAF Engineering Division also advised Douglas that any developmental work on the four 37mm cannon nose was to be stopped and the project completely cancelled, as was work on installing a package of twin 37mm cannon under the bomb bay. A memorandum noted that, 'a recent test of these guns suspended below a B-25 airplane produced serious damage to the nose wheel doors and skin structure when the gun was fired…' However, the AAF specified that a provision to install parachute fragmentation bomb racks in the early A-26 deliveries was desired, with a capacity of between 150 and 180 of the small bombs. This was no doubt due to the success being enjoyed with these bombs in the south-west Pacific by B-25 crews.[35]

On 3 March 1943 the Materiel Command specified that the all-purpose nose aircraft deliveries would be worked into the production lines as soon as possible, and that alternative installations, consisting of 200 kits for four-gun noses and 200 for two 37mm and two gun noses, would also be produced and delivered to a specialized air depot. Little further mention was made regarding the installation of the 75mm cannon on A-26s. On 17 March it was determined that the all-purpose nose would be introduced to the Long Beach line at fuselage number 21 and to the Tulsa production line at fuselage number 16. At the same production line point, provisions were also made to add the wiring and hard points for the external wing gun packages.

Also on 17 March the contract for the second batch of 500 A-26s was approved. This, designated as AC-34433, provided for the production of 500 A-26Bs (later changed to an A-26B/A-26C split) from the new Tulsa plant beginning in January 1944. The unit cost for the 500 aircraft was $152,125 and included spare parts and other material for a total contract price of $109,164,900, including a 4 per cent fixed-fee for Douglas, or $6,089 per delivered aircraft. The increase in the unit



This view shows a construction jig for the aft fuselage in October 1943 and demonstrates the semi-monocoque construction used on the A-26 fuselage. The numbers on the bottom frame are fuselage station numbers derived from the distance in inches from the datum point which, on the A-26, was the bulkhead ahead of the cockpit. Boeing Historical Archives



Production output from Long Beach in May 1945 showing seventeen A-26s on the assembly line. Two lines of twelve each were utilized for the production process. This view depicts how the completed fuselages were mated to wings in the final assembly area. Boeing Historical Archives

cost of the aircraft from $134,037 on the first contract to $152,125 was attributed to additional engineering costs for expedited production, beginning a new production line at Tulsa and increased labour costs at Tulsa. The 500 A-26Bs were allocated Army serial numbers 43-22252 to 43-22751 and Douglas assigned line numbers 18399 to 18898.

The arrangement that the AAF had finally settled on for the armament configuration was only transitory, however. On 29 April 1943 the Material Division directed that 167 of the 500 A-26Bs delivered from Tulsa would also have bomber noses available for installation. Any subsequent deliveries of A-26s ordered would be in the ratio of two gun-nosed aeroplanes for every bomber-nosed version. In a confusing note, it was also determined that the all-purpose gun nose could not be introduced until the 501st aircraft delivery; thus the first 500 would again be delivered with the 75mm cannon nose. It appears that this specification was outdated because the introduction of the all-purpose nose to the Tulsa line was settled six weeks earlier.

Production Begins

Production was slowly getting under way at the Long Beach plant. The first few aircraft coming down the assembly line were hand-built examples using the tooling that built the XA-26. One of the major delays in accelerating production was the absence of special milling equipment needed to produce tapered spar caps for wing production.

Tooling had become a significant problem not only in A-26 production but also across the industry as aircraft production vastly expanded. Between 1940 and 1943 almost every major manufacturer ascribed its production problems chiefly to machine tool shortages. The tooling industry was small, specialized and not easily subjected to rapid expansion.[36] However, the problems associated with the A-26 were also due to the wing spar design. The spar caps, four of which were required for each wing, tapered in width, depth and height from the wing roots to a point about 6ft (2m) from the wing tips. At that point, the four caps were butt-jointed to another set of four caps that carried the structure to the end of the wing. The design of the four



Line-up of A-26Bs at Long Beach in March 1945 while awaiting delivery. Though it suggests the output of the factory, it is also indicative of delivery delays that continued to plague the A-26 programme. In many cases dozens of A-26s were lined up awaiting a few parts before acceptance and delivery. There are twenty-six Invaders on the delivery ramp in this view. As a comparison, there is only one B-17, also built at Long Beach by Douglas. Boeing Historical Archives

inboard caps was such that specialized tooling was required to machine them to specification. Also, each of the four caps was machined differently and required an individual set-up for the tooling.

As production was being planned at both Long Beach and Tulsa, the AAF decided that two machine shops would be set up to mill the spars: one at the Douglas Santa Monica facility and another at a subcontractor, the American Seating Co. of Grand Rapids, Michigan. The Santa Monica facility would provide spars for Long Beach production while American Seating would provide them for the Beech Aircraft Co. at Wichita, Kansas, which was subcontracted to build wings for Tulsa A-26 production.[37]

The Santa Monica shop began production of the spars in May 1943, but by December had produced only twenty-five sets – all of which had been delivered to Long Beach. The delays were attributed to 'unforeseen difficulties in the machining operation entailed on these spars and the lack of sufficient machinery'.[38] Additional machinery was received and a further sixty-six sets were

A-26 Production: Ordered/Built/Delivered										
	Total Ordered	Total Built	DE Built	DL Built	DT Built	Total Delivered	Not Delivered	Cancelled	After Production Modified	Remarks
XA-26	1	1	1			1				
XA-26A	1	1	1			1				
XA-26B	1	1	1			1				
A-26B	1,800	1,379		1,174	205	1,357	22	421		
A-26C	1,900	1,144		5	1,139	1,092	52	756		
A-26D	750	0						750	2	44-34100 41-39543
A-26E	3,250	0						3,250	1	44-35563
XA-26F	0	0							1	44-34586
TOTAL	7,703	2,526	3	1,179	1,344	2,452	74	5,177	4	
El Segundo	3	3	3			3				
Long Beach	2,350	1,179		1,179		1,157	22	1,171		
Tulsa	5,350	1,344			1,344	1,292	52	4,006		
TOTAL	7,703	2,256	3	1,179	1,344	2,452	74	5,177		

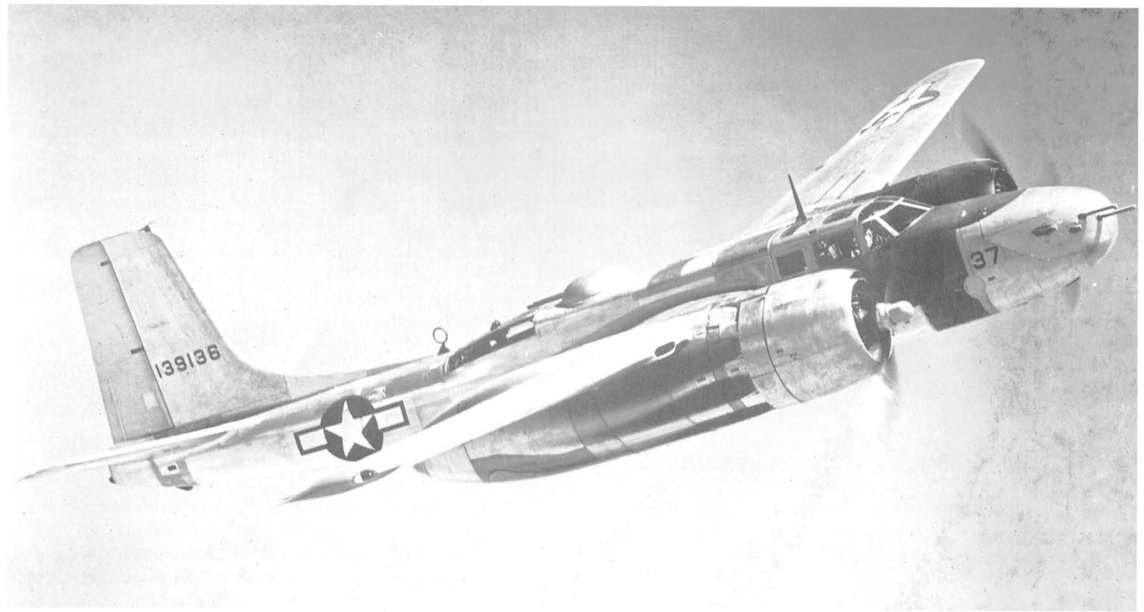
produced by March 1944. American Seating was not expected to deliver its first spar set to Wichita until June 1944, however. As of 11 April ninety-five wing spars sets had been produced at Santa Monica, all of which had been shipped to Long Beach for anodizing and quality control. Long Beach shipped twelve sets to Beech for incorporation into their wing production line. Thirteen sets of partially-completed wing assemblies built at Long Beach were shipped on to Tulsa to help in getting their A-26 production going. Only thirty-eight sets of complete wing and nacelle assemblies had actually been built at Long Beach for incorporation into the Long Beach assembly line.[39]

The first A-26B, s/n 41-39100, was accepted from Long Beach by the AAF on 10 September 1943 and was actually a month early based upon the revised delivery schedule (or nine months late based upon the original schedule). There had been a significant push by the Long Beach employees to get the aeroplane out the door and delivered and the Materiel Center was urged to get it off the Long Beach ramp as quickly as possible to vindicate their efforts. However, for the rest of 1943 only six additional A-26Bs were delivered. These first few aircraft were built with provisions for the 75mm gun. Production remained at a trickle due to spar deliveries; January 1944 saw five more completed, with the first delivered from the Tulsa plant. February saw another seven accepted from Long Beach but none from Tulsa.



A-26s awaiting AAF acceptance at Long Beach, each probably lacking a few parts. These aircraft were all built with the six-gun noses. The small number painted on the nose is the Douglas fuselage number, indicating where the aircraft fell on the A-26 assembly line. Boeing Historical Archives

Frustrations in not being able to get the A-26 into significant production went to the top of the Army Air Forces. Gen Henry 'Hap' Arnold, commanding general of the AAF, sent a scathing memorandum to Gen Oliver P. Echols,



This view shows an early production A-26B with the six-gun nose and early framed canopy. Only the first and last production A-26Bs were delivered with camouflage paint; the rest were unpainted. Boeing Historical Archives

assistant chief of Air Staff, Materiel, Maintenance and Distribution, that addressed problems with both the B-29 and the A-26 programme. With regard to the A-26 he commented:

> Conditions in the A-26, while not as bad [as the B-29], are almost as bad. As we are moving now, the A-26 will be ready for the next war and not for this one. We cannot have more A-26s although we have plenty of fuselages, but not enough wings. We could build more wings if we had more spars, but we cannot build more spars due to difficult output of machinery. We might be able to build more wings if we were able to get more machinery, but whether we will be able to get more machinery I was unable to determine and nobody could give me the answer. One thing is certain: I want the A-26 for use in this war and not for the next war. If something drastic is not done, we cannot hope to replace the B-25's, B-26's and A-20's with the A-26.

And, in a closing comment, Arnold told Gen Echols to 'let me have your plan for producing the A-26. Let me have this plan within the next few days.'

Obviously, there were many factors in the delay process; however, Echols placed the blame squarely upon Douglas Aircraft in his response to Arnold on 16 March 1944:

> With reference to the A-26, both this office and the Materiel Command have been endeavoring for many months to get the Douglas Company to take greater interest in the manufacture of this airplane. The Materiel Command spent a great many months locating and recommending to Douglas subcontractors to assist in the manufacture of this airplane and urging Douglas to place his orders for tools and subcontracting. The Douglas Company seemed to have little interest in or little desire to manufacture this airplane.
>
> At the present time it seems reasonable to expect the Douglas Long Beach plant to approximately meets its ... schedule for A-26s. The Tulsa plant is behind schedule due to a lack of wings which are to be manufactured by Beech Aircraft Corporation. The Beech Aircraft Corporation is behind schedule on wings, due to the delay in the delivery of the machine tools for the manufacture of the spars. I am informed that at the present moment we are 30 sets of spars behind schedule.

It seems clear that Echols was being particularly harsh about the efforts of Douglas. Aside from tooling difficulties that were widespread throughout the industry, he made no mention of the continuing confusion over the AAF instructions with regard to armament installations and its changing engineering demands, nor to the warnings Douglas had passed along, beginning in early 1942, that production was falling behind schedule due to delays in the prototypes.

Almost in desperation, and with fewer than twenty-five aircraft actually delivered, the AAF proposed to assign four A-26Bs (production numbers 17 through 20) to combat trials with the Fifth Air Force in the south-west Pacific, beginning in May 1944.

While the A-26's combat debut was being planned, and against the backdrop of what the AAF considered unacceptable delays, the AAF also demonstrated its faith in the worth of the A-26 design when an additional 2,500 A-26s were ordered on 29 March 1944. The massive order was negotiated as supplements to the existing two production contracts: Supplemental Agreement No. 13 to AC-21393 procured 1,100 A-26Bs for production at Long Beach, while Supplemental Agreement No. 3 to

AAF A-26 Contracts					
AAF Contract Number	**Number Contracted**	**AAF Serials**	**Total Contract Amount**	**Date Signed**	**Remarks**
W535 AC-17946	XA-26 (1), XA-26A (1)	41-19504/19505	$2,208,308,94	2/6/41	prototypes
W535 AC-17946 (amended)	XA-26B (1)	41-19588	$541,773.05	9/6/41	prototype
W535 AC-21393	A-26 (500)	41-39100/39599 (42-11754/12253)*	$78,264,093.00	31/10/41	495 A-26Bs, 5 A-26Cs accepted on this contract
W535 AC-34433	A-26B (500)	43-22252/22751	$109,164,900.00	17/3/43	295 A-26Bs, 205 A-26Cs accepted on this contract
W535 AC-21393 (Sup. 13)	A-26B (1100)	44-34098/35197	$124,196,622.26	29/3/44	657 A-26Bs accepted on this contract
W535 AC-34433 (Sup. 3)	A-26B (1600)	44-35198/36797	$184,257,996.87	29/3/44	792 A-26Cs accepted on this contract.
W33-038 AC-5140	A-26 (2000)	45-17343/19342	$188,532,840.00	30/11/44	cancelled 31/5/45 (A-26E)
W33-038 AC-5141	A-26B (400)	45-22393/22792	$43,467,149.44	30/11/44	cancelled 27/8/45 (A-26D)
W33-038 AC-5140 (Sup. 7)	A-26 (1250)	45-53575/54824	$106,211,313.13	5/4/45	cancelled 31/5/45 (A-26E)
W33-038 AC-5141 (Sup. 3)	A-26D (350)	45-54825/55174	$33,344,067.12	13/4/45	cancelled 27/8/45

*Apparently assigned after delayed contract negotiations entered FY 1942 (beginning 1/7/41) but not used; instead, original serial block retained.



Five early A-26Cs were also built at Long Beach, this view showing one of them at delivery in July 1944. Shortly afterwards, all A-26C production was shifted to Tulsa where the assembly line produced both A-26Bs and A-26Cs to the end of 1944. Boeing Historical Archives

AC-34433 procured 1,600 A-26Bs (later changed to A-26Cs) for the Tulsa plant. Both contract supplements included spare parts, special tools and other material. The Long Beach contract amounted to $124,196,622, including a $4,776,703 fee to Douglas. The Tulsa contract was for $184,257,997. Thus, with fewer than thirty aircraft actually delivered, Douglas now had a backlog of nearly 3,500 A-26s.

First Deliveries

The first A-26s assembled at Long Beach came off the line in different configurations. Though not definitive from any uncovered record, it would appear that the first twenty or so A-26s, encompassing the A-26B-1-DL and A-26B-5-DL blocks, were built with the 75mm gun nose. At least the first five were actually delivered with the cannon. However, the four A-26s earmarked for combat trials in the Pacific, numbers 17 through 20 on the production line, were apparently equipped with hand-built, all-purpose noses to allow trials with different armament configurations. Beginning with the twenty-first production A-26B, the nose armament configuration was changed to the all-purpose gun nose equipped with six .50 calibre guns. The AAF also requested some of the A-26Bs to be delivered with the bomber noses and, beginning with the fifty-third production aircraft, s/n 41-39152, a total of five bomber-nosed A-26Cs were delivered on the original Long Beach A-26B contract.

Aside from the four A-26Bs earmarked for combat trials with the Fifth Air Force, the initial deliveries of Invaders from Long Beach were largely destined for training units at Florence AAF and Columbia AAF, both in South Carolina. These two fields would remain pivotal in A-26 training, as combat crews moving to the new bomber would be rotated through one or the other of them.

The first A-26 from the Tulsa factory was accepted for service on 31 January 1944, but not actually delivered until late March. Production was slow to get under way, with the tenth airframe not delivered until early May and the fiftieth not until August. Production began to accelerate, though, with forty aircraft being delivered in September and fifty-four in October. Fuselage number 500, completing the first production contract at Tulsa, was delivered on 23 March 1945.

As aircraft trickled off the assembly lines, attempts to incorporate design changes also caused additional delays. Many of these were due to specific requests by the AAF to incorporate new equipment, and also to aircraft production begun before design and tooling difficulties were alleviated. At one point in early 1944 as many as thirty-five change orders were issued to the production line each day.[40]

During flight trials with the XA-26 and initial evaluations conducted by the Air Proving Ground at Eglin Field, the lack of visibility from the cockpit was identified as the biggest deficiency of the A-26 design. Efforts were begun by Douglas to improve the visibility by eliminating the broad framing in the canopy and providing higher seating for the pilot to allow views over the large nacelles. These visibility limitations had been identified early in the design process and nothing substantial had yet been done to correct them.

On 16 February 1944 the AAF initiated action to procure external wing gun packages for two-thirds of the total A-26 production, including spares. This order was later modified to request the under-wing packages for all of the first 1,000 aircraft produced. These under-wing guns were attached to special fittings built into the wing surface and consisted of two packages equipped with two .50 calibre guns for each installation. Ammunition for each gun was carried in a bay built into the wing structure and fed into the guns through slots in the under-wing surface. The additional guns were an effort to enhance the forward firepower for both the cannon-equipped and the bomber-nose equipped A-26s.[41] As noted earlier, the installations began at fuselage number 21 at Long Beach and fuselage number 16 at Tulsa.

As the first four A-26Bs were shipped off to the Fifth Air Force in May 1944, plans were under way to begin equipping units in the European Theater of Operations (ETO) with Invaders. On 21 May 1944, with fewer than forty aircraft delivered, the Air Staff issued a memorandum outlining a plan to have eighteen A-26s ready for departure to Europe on 1 August. Six were to have the bomber noses, with the remainder equipped with the six-gun noses. Rather than try and train combat crews who were currently flying the B-26 Marauder on the A-26, it was felt that to use already trained Invader crews to move the aircraft to England to fly combat missions would be more effective.[42] Departure was set for 1 August, based upon the hope that cockpit visibility improvements could be made to the aircraft by then. The memorandum noted:

With the exception of the nose section, the A-26C was virtually identical to the A-26B and they were built concurrently. The AAF continually revised its requirements; in the beginning the need was for two or three A-26Bs for every A-26C delivered. However, 1,357 A-26Bs and 1,092 A-26Cs were actually delivered to the AAF. Boeing Historical Archives



> Assistant Chief of Air Staff, Materiel, Maintenance and Distribution cannot guarantee delivery prior to that date of airplanes having the re-worked pilot's canopy. Of the airplane's unsatisfactory features which have come to light here, one of the most vital is the restricted vision from the cockpit. The Proving Ground Command's report on the A-26 took cognizance of this and states 'the wide frames of the cockpit structure interfere with the pilot's vision to a considerable extent.' Formation flying, at best, is difficult with the A-26, due to the inherent visibility limitations and, since the airplanes on this project are to be subjected to combat test, all possible improvements in visibility are believed mandatory. The removal of the wide canopy frames, which will be accomplished on the re-worked canopy, will be of pronounced value in this respect.[43]



To satisfy the requirements of the Fifth Air Force in the Pacific, the last production A-26Bs were delivered without lower turrets, replaced instead with additional 125gal (473ltr) fuel tanks. Provisions were made to carry rockets and external fuel tanks and the aircraft were finished in overall olive drab. These aircraft could mass fourteen .50 calibre guns for strafing attacks and carried another two in turrets. Most of these special production Invaders never made it to the Pacific before the war ended, though they did equip the 3rd Bomb Group for the occupation of Japan and many were on hand, still in their olive drab scheme, when the Korean War began five years later. Boeing Historical Archives

As it developed, none of the aircraft sent to England in August had the revised canopy; the final configuration of the new canopies would not be installed on any A-26 until September 1944.

To compound the production problems, the Wright Field Aircraft Laboratory was conducting static tests on the A-26 wing. In May 1944 the wing spar failed at slightly more than 80 per cent of its ultimate load in the positive low-angle-of-attack condition at a normal gross weight of 26,000lb (11,800kg). It was recommended that the A-26B be restricted to a maximum flying weight of this value, a maximum load factor of 3.6 g and a top speed of 340mph (550km/h).[44]

Efforts were made to strengthen the wing design and additional tests were conducted. This time the wing spar failed at 95 per cent load. The Aircraft Laboratory noted that a conventional wing design could be 'easily reinforced to give added bending strength but the A-26 wing was designed so that the wing spars must support the entire bending load.' The Laboratory listed poor design features of the wing and recommended certain changes. Douglas immediately worked to strengthen the wings of aircraft on the production line and began a redesign of the wing to make it stronger by at least 10 per cent.[45]

In June and July 1944 the four A-26Bs were evaluated by 3rd Bombardment Group (Light) crews operating out of bases in New Guinea. The aeroplane was found lacking, particularly with respect to the restricted visibility and marginal performance improvements over the B-25s and A-20s currently in service. Though the external, wing-mounted guns added a significant punch, they also reduced the top speed by a reported 25mph (40km/h). After the service test was concluded, the crews forwarded a list of thirty-two improvements required before the aeroplane could be considered combat-ready.

Gen George Kenney, commanding general of the Far Eastern Air Force, made his feelings clear about the A-26 after the combat trials: 'We do not want the A-26 under any circumstances as a replacement for anything.'[46] It was noted that the four A-26Bs sent to the theatre for the trials were now grounded and parked with their engines pickled. Indeed, none of the aircraft apparently ever flew again and they were eventually scrapped on site. Any plans to equip units in the Pacific with A-26s were shelved until improvements, particularly as regards the new canopy, could be completed.

There was no doubt that the Fifth Air Force developed an immediate, intense and persistent dislike for the A-26. War planners in Washington and at Wright Field were convinced that the perceptions of the 3rd Bomb Group (BG) were largely unfair and that some of the shortcomings of the A-26 had already been corrected by Douglas. However, a tactical decision was made to shift deployment of the A-26 to the ETO first.

Canopy Problems

Eighteen A-26s were delivered to the Ninth Air Force in August 1944. Most of them were assigned to the 386th BG, based at Great Dunmow in Essex, and flew seven combat missions in September. Officially, the A-26 fared much better in its European trials. In an Air Staff report on the trials dated 18 October it was noted that:

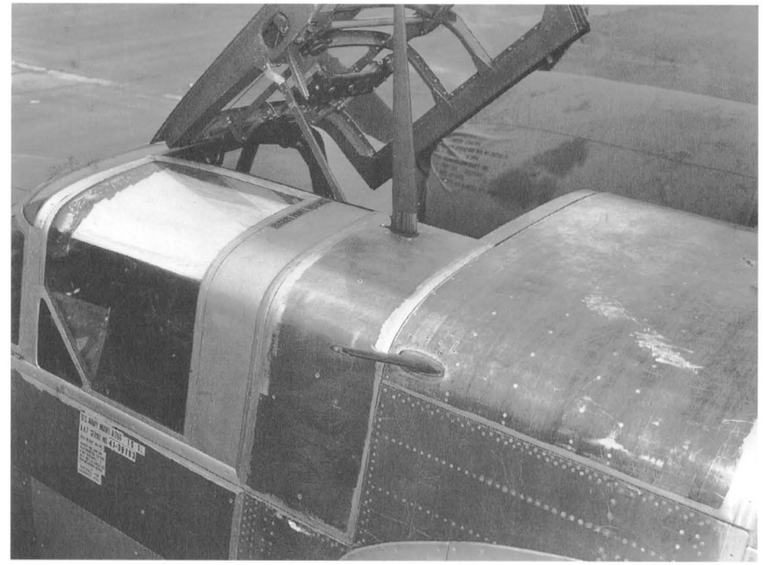
> the A-26 is very effective as a medium altitude bomber. The large and more variable load makes it superior to the A-20, while the range exceeds the A-20 and B-26. Its superior single-engine performance is a very important asset. Its speed advantage over other medium bombers, plus its flying qualities and its maneuverability and ease of maintaining formation, permit longer missions with less crew fatigue. A strong asset is the saving of flying personnel requirements. Excellent visibility in the bombardier nose is one of the greatest advantages. It is concluded that, as a medium altitude bomber, the A-26 aeroplane has met successfully the tests imposed by combat conditions in the ETO.[47]

The report did note that poor pilot visibility necessitated that the combat formations flown be modified to accommodate the A-26. It was added, though, that a canopy modification was in place to improve visibility. In addition, the report explained that the trials were

not exhaustive because of the types of mission to which the aircraft were assigned. No opposition was encountered to test the defensive armament. However, it was felt that the aircraft would be a suitable replacement for the A-20 and the B-26 in the ETO.[48]

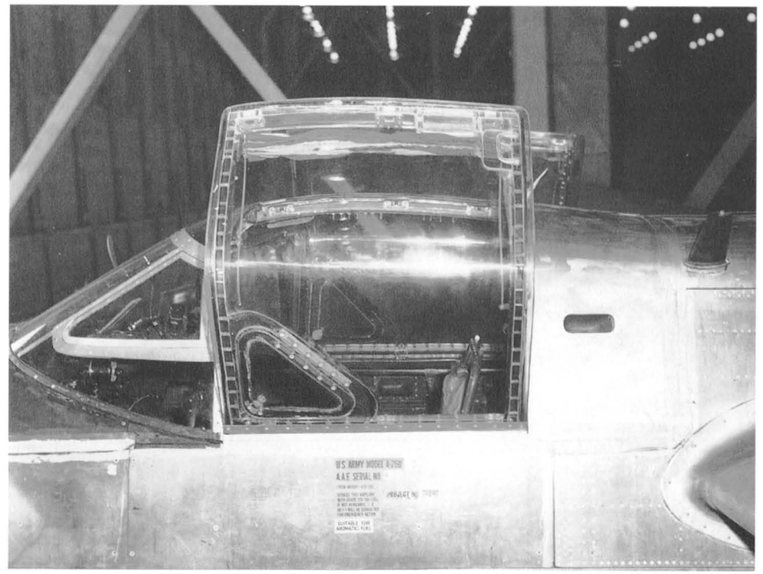
In June 1944 a modification to the original canopy began appearing on the assembly line. The main feature of the canopy was an unobstructed piece of moulded Plexiglas that replaced the framing to the left of and above the pilot. Some of the framing on the right side below the hatch was also eliminated and replaced by a single piece of Plexiglas. This proved to be an interim canopy and did not solve the problem of restricted visibility over the engine cowlings. Several hundred of the early Invaders were delivered with the improved flat-top canopy, but it took several more months before Douglas finally produced a significant revision to the design that satisfied the AAF.

In mid-September 1944 a hand-built prototype canopy was installed on an A-26B at Long Beach. Two moulded Plexiglas hatches, bulging upward over the cockpit, replaced the flat, framed canopy. The two hatches were hinged on the outside edges, opening outward in a clamshell fashion and meeting in the middle when closed. The decking behind the cockpit was also modified to meet the lines of the bulging canopy as it faired back into the fuselage. Besides the improved visibility, the higher canopy also allowed the pilot to look over the top of the nacelles on each side of the aeroplane, with the right-side hatch extending further aft than the left hatch to increase visibility toward the right rear of the cockpit. One drawback was that the top turret guns could no longer be locked forward for use by the pilot for strafing since the canopy bulged into the line of fire. However, the new Plexiglas canopy was finally an acceptable solution to the persistent visibility problems. The modified A-26 was taken on a whirlwind tour to Washington, DC, Wright Field and the Air Proving Ground at Eglin Field. The commander of the 3rd BG, one of the pilots who had flown the A-26 in the south-west Pacific, flew the aeroplane in Washington and was 'well-pleased with the improved visibility and indicated that the airplane should be operationally suitable in the Southwest Pacific



Above: **This view shows an interim step taken to improve cockpit visibility problems. The framing above the pilot has been removed and replaced by a piece of curved Plexiglas. However, the heavily-framed hatch remains in place. Beginning with fuselage number 84, these interim canopies were added to the assembly line.** Boeing Historical Archives

Below: **In September 1944 the final configuration for the new clamshell canopy was established. The seat mounting was raised a little and unobstructed moulded Plexiglas replaced the heavy framed canopies. As my be seen in this profile view, a fairing was required to bring the fuselage line up to meet the higher canopy. The raising of the canopy height precluded the use of the top turret guns locked forward and depressed for strafing attacks.** Boeing Historical Archives





Another view of the new canopy in the closed position. Pilots who had flown the Invader with the 3rd Bomb Group in May 1944 and found the aircraft unusable because of the visibility problems test flew the model with the new canopy and found it entirely acceptable. Boeing Historical Archives

theater.'[49] All who saw or flew the aircraft agreed that the problem would be fixed when the revised canopy could be added to the production Invaders.

Getting the new canopy on to the assembly line caused additional ill-will between Douglas and the AAF. Douglas rushed to get the production tooling into place and committed itself to add the new canopy to the production line at Long Beach at the 252nd model (s/n 41-39351), scheduled to be delivered during the last week of October 1944. Tulsa production line managers, however, felt that the new canopy could not be incorporated into the A-26 line until their 501st aircraft (s/n 44-35918), scheduled for the end of January 1945 (actually delivered in March). The reason stated was that Long Beach was able to move direct from engineering to production but that Tulsa was delayed in getting specifications for the tooling from Long Beach.[50]

Any benefit of the doubt that Gen Arnold had about Douglas and the A-26 programme evaporated when he heard about the projected ninety-day delay in getting the new canopy to the Tulsa A-26s. In a sharply worded telegram to the Air Technical Service Command on 13 October 1944, he indicated that little credence should be given to the Douglas explanation for the delay. That engineering information could not be transferred between Long Beach and Tulsa seemed inexplicable since a company aeroplane flew between the two factories each week. He added that,

> It is believed that the contractor had he so desired and exerted the effort of which he is capable could have made this change in production far more quickly and a far more suitable airplane would be available for combat. It has been definitely established that correction of poor visibility in this airplane is a feature affecting the military utility which can be reckoned in terms of lives and in ability to use the airplane in combat units ... It is concluded that the contractor's efforts in connection with this airplane have been far from satisfactory and little short of reprehensible.[51]

At the prodding of the AAF, Douglas–Tulsa concluded that it could incorporate the new canopy on its 351st aircraft (s/n 43-22602), due to be delivered in late December 1944, and would make every effort to install hand-built canopies on as many earlier aircraft as possible.[52]

Of the eighteen A-26s sent to England in August 1944, one was assigned to the RAF for flight evaluations. Though not assigned an RAF serial number, that particular A-26B, s/n 41-39158 (the fifty-ninth production aircraft), was flown to the Aeroplane and Armament Experimental Establishment at Boscombe Down, arriving on 11 July. It was evaluated in a test programme for the subsequent six weeks, after which the RAF assigned it to an operational bomber group, 2 Group, for further evaluations. It unfortunately crashed on 4 September, when the upper turret cover left the airframe and struck the vertical tail. Based upon operational planning, the RAF requested the provision of 480 A-26s via Lend-Lease for assignment to the Commonwealth air forces. As it happened, only two additional A-26s were actually transferred.[53] (*See* Chapter 8.)

On 26 November 1944 the AAF Operations, Commitments, and Requirements Division recommended to the chief of the Air Staff that decisions about A-26 and B-25 production and deployment should be firmly made. A memorandum stated that, if current production continued, a surplus of more than six hundred B-25s would exist by September 1945 and, if the A-26s were not earmarked for Pacific deployment, a surplus of A-26s would exist by the end of 1945. It was recommended that all the bomb groups equipped with the B-26 in the ETO be re-equipped with the A-26 as soon as possible, followed by the replacement of the B-25. The order of replacement was suggested to be the European Theater, the Mediterranean Theater, the China–Burma Theater, the Far Eastern Air Forces and the North Pacific groups. The paper concluded: 'It is considered most desirable that the conversion to A-26s be accomplished without exception. The A-26 is not only the best medium or light bomber in sight, but the conversion will permit standardization of crew training and a simplification of supply problems.'[54]

On 30 November 1944 two new contracts were approved by the War Department for additional A-26 production. Contract AC-5140 procured 2,000 A-26Bs and A-26Cs from the production line at Tulsa. The total contract price was for $188,532,840, including spare parts and a fixed fee to Douglas. The unit cost was $79,008. The serial block assigned to these aircraft was 45-17343 to 45-19342.

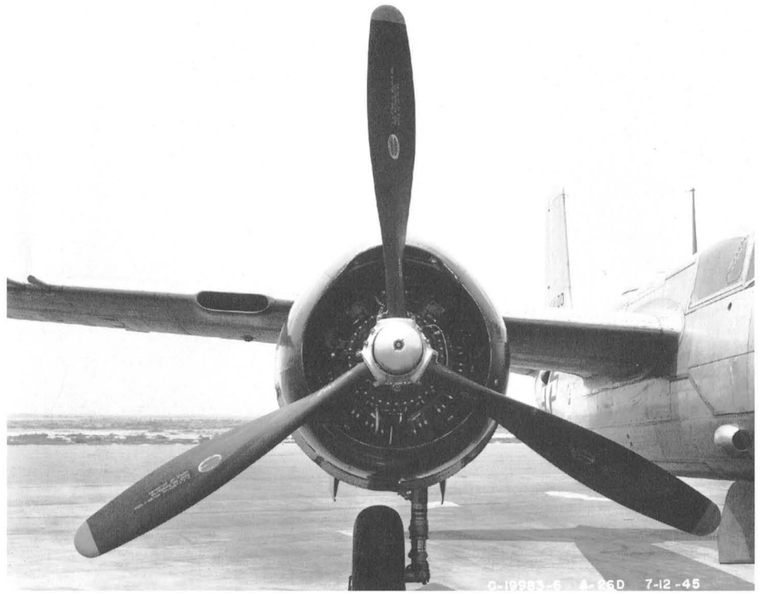
Production Block Changes		
Block	No.	Changes
A-26B-1-DO	0	(not built) similar to the (X)A-26 except for 75mm cannon in nose; similar to the XA-26B except bombing installation provided and range finder not provided
		Long Beach Production
A-26B-1-DL	5	same as the A-26B-1-DO except built at the Long Beach factory
A-26B-5-DL	15	as A-26B-1-DL except deletion of mechanical emergency flap controls and provisions for automatic pilot; revised wiring for wing racks using five-prong plug; gun heaters for wing and nose guns changed from CFE to GFE; deletion of camouflage; dust excluders provided; 125gal tank in bomb bay for use with fragmentation racks; GFE Type A-1 bomb release receptacle; provisions for low impedance head sets; other minor changes
A-26-10-DL	20	as A-26B-5-DL except provisions for design and installation of all-purpose gun nose; revision of armour plate at station '0' to accommodate all-purpose nose; revision of dural deflector plates reducing thickness from 3/8in to 5/16in; installation of magnesyn compass in vertical fin; change in engines to Ford built R-200-27 or Pratt & Whitney modified engines
A-26B-15-DL	56	as A-26-10-DL except for installation of all-electric bomb release system with Type A-4 bomb release; provisions for Type R-1 fragmentation bomb racks; N-9 gun sight; revised pilot's instrument panel; revised release equipment on all-electric bomb release system; change in aileron boost tab ratio from .375:1 to 1:1
A-26B-20-DL	99	as A-26B-15-DL except revised flat-top canopy added plus other undetermined changes
A-26B-25-DL	50	no information available
A-26B-30-DL	75	no information available
A-26B-35-DL	75	as A-26B-30-DL except revised bubble canopy incorporated into production
A-26B-40-DL	100	no information available
A-26B-45-DL	120	as A-26B-40-DL except engines changed to Ford-built R-2800-79 with water injection
A-26B-50-DL	109	as A-26B-45-DL except internal wing guns added, eight-gun nose standard, provisions for under-wing rockets
A-26B-51-DL	6	as A-26B-50-DL except 125gal auxiliary fuel tank replaced lower turret
A-26B-55-DL	121	no information available
A-26B-56-DL	19	as A-26B-50-DL except 125gal auxiliary fuel tank replaced lower turret
A-26B-60-DL	34	no information available
A-26B-61-DL	110	as A-26B-60-DL except 125gal auxiliary fuel tank replaced lower turret
A-26B-65-DL	0	none built
A-26B-66-DL	136	as A-26B-61-DL except 125gal auxiliary fuel tank replaced lower turret
A-26B-70-DL	0	none built
A-26B-71-DL	0	none delivered
A-26C-1-DL	1	no information
A-26C-2-DL	4	no information
		Tulsa Production
A-26B-5-DT	15	same as the A-26B-1-DO except built at Tulsa factory
A-26B-10-DT	35	as A-26B-5-DT except for provisions for all-purpose nose with attached fittings and electrical connections; revisions to armour plate at station '0'; reduction in weight of steel armour plate; magnesyn compass in vertical fin; deletion of white upward recognition light; change in aileron boost tab ration from .375:1 to 1:1; protection for lower sight optic
A-26B-15-DT	88	as A-26B-10-DT except for all electric bomb release system with Type A-4 bomb release; provisions for Type R-1 fragmentation bomb racks; Type N-9 gun sight; revised pilot's instrument panel; revised release equipment in all-electric bomb release system; modified pilot's canopy; R-2800-71 engine with revised ignition system
A-26B-20-DT	54	no information available
A-26B-25-DT	13	no information available
A-26C-15-DT	27	no information available
A-26C-16-DT	10	no information available
A-26C-20-DT	71	no information available
A-26C-25-DT	187	no information available
A-26C-30-DT	160	as A-26C-25-DT except revised canopy incorporated into production line
A-26C-35-DT	200	no information available
A-26C-40-DT	97	no information available
A-26C-45-DT	127	as A-26C-40-DT except Ford-built R-2800-79 with water injection, internal wing guns, provisions for under-wing rockets
A-26C-50-DT	155	no information available
A-26C-55-DT	52	no information available

Contract AC-5141 was also approved on that day and covered the procurement of 400 A-26Bs from the Long Beach plant for a contract cost of $43,467,149 including spare parts and a 4 per cent fixed-fee to Douglas. The unit cost was $86,354. These aircraft were assigned a serial block from 45-22393 to 45-22792. The total contracted production for the A-26 programme, including prototypes, thus stood at 6,103 airframes with deliveries set through February 1946.

As 1944 drew to a close, the A-26 programme was still stumbling but there were signs that it was finally coming together. Total deliveries from Long Beach reached 395 and 90 had been delivered in December. Deliveries from Tulsa were still a mixed batch of A-26Bs and A-26Cs, with 315 delivered through to the end of the year. In December 1944 80 had been delivered. The revised canopy was being incorporated into the production line and all the gun-nosed aeroplanes were delivered with the all-purpose nose equipped with six .50 calibre guns. In the preproduction stage were modifications that would place three .50 calibre guns internally in each wing; a new all-purpose nose equipped with eight .50 calibre guns and provisions to carry rockets, bombs or drop tanks under the outboard sections of the wings.

As for the introduction of the wing guns, a Procurement Division document of 26 December 1944 notes the expectation that the guns would be incorporated at fuselage number 621 at Long Beach, expected to be delivered in March 1945. For Tulsa production, the incorporation point was undetermined because the wings were being built by Beechcraft at Wichita. The document noted that the guns could not be added to the wings until May 1945 because 'Beech lacks aggressiveness in scheduling changes, particularly on the installation of water injection provisions and the engine fire extinguisher system.'[55]

As the New Year began, the Tulsa production situation was changed. The AAF directed that after January 1945 Tulsa would build only the bomber-nose A-26C.[56] The last A-26B built at Tulsa was fuselage number 338 (s/n 43-22589). The last delivery of the original Tulsa contract for 500 aircraft was made on 23 March 1945. Of these 500, 205 were built as A-26Bs and 295 as A-26Cs. The new internal wing guns were incorporated into the Long Beach production line beginning in early March 1945, with the Tulsa plant following shortly thereafter.[57]



Efforts were under way in the summer of 1945 to equip the A-26 with the uprated C series of the R-2800. Planned production was for the A-26D to replace the A-26B and the A-26E to replace the A-26C. The essential change was the use of the 2,100-horsepower Chevrolet-built R-2800-83 with other carburettor, cowling and engine-mount changes as needed. This view shows a prototype installation of the engine on A-26B s/n 44-34100. Note how the carburettor air scoop on top of the cowling has been made shallower and widened. Boeing Historical Archives

Experience in Combat

As combat experience was gained with the aeroplane after it entered service with the Ninth Air Force, reports on the aircraft's suitability were largely favourable. Maj Gen Samuel Anderson, commander of the Ninth Bombardment Division, forwarded his comments on the A-26 to Gen Arnold on 4 January 1945:

> In general the A-26 is very satisfactory aircraft [sic]. Pilots take to it quicker than they took to either the A-20 or the B-26 and once they become familiar with the A-26 consider it superior to anything they have flown before. One major reason for the pilots liking the aircraft is the superior single-engine performance. Recently a pilot of the 409th Group took off with four 1,000lbs [450kg] bombs and a full load of fuel aboard. He lost an engine at approximately thirty feet but had no trouble at all. In fact, he did not just circle and land immediately, but gained altitude and circled the field until the remainder of the formation had taken off for their mission.
>
> Wright Field established 31,000lbs [14,060kg] as maximum landing weight. It was felt that the gear would not stand up under any greater weight. We have, however, on several occasions landed planes with four 1,000lb bombs and 700 gallons [2,650 litres] of fuel aboard. This makes a landing weight of approximately 33,200lbs [15,060kg]. As yet no gears have collapsed. This is not, however, standard practice and is done only in emergency since we feel that continuous landings with an overload would cause fatigue and eventual collapse of the landing gear. It does increase the pilot's confidence to know that in an emergency he can land with an overload with the expectation that the landing gear will not collapse.[58]

However, a serious flaw in the design of the nose wheel doors was also revealed by other reports. A memorandum dated 15 January 1945, from the Director of Technical Services in the ETO outlined the identified problem:

> Considerable difficulty has been reported from all service activities with failure of the nose wheel to extend. The principle cause for these failures appears to be the freezing of mud and water on various moving parts after the airplane is airborne. With the present design of landing gear doors, which are open in the wheels down position, great quantities of mud is [sic] splashed on to the gear mechanism during taxying [sic] and takeoff. This subsequently freezes and thus locks the doors and gear in the up position. It is understood that a small mud guard over the nose wheel has been tried with some success, however, the complete solution appears possible only by having the doors closed in the wheels down position.[59]

Other problems identified by the first serious combat experience with the aeroplane included leaking cockpits, particularly those with the early canopies, and those associated with water corroding and shorting-out various items of equipment.[60] The wheel brakes were also identified as deficient, with the major seal of the brake cylinders failing frequently and resulting in a total loss of braking capability. The emergency air braking system installed as a back up to the hydraulic brakes also failed because they required intact brake cylinders to work.[61]

The rear gunners were also concerned about their ability to escape from a damaged A-26. A gunner's only egress from his compartment when the bomb bay contained bombs was through his entrance hatch above the compartment. To parachute with the vertical stabilizer just feet to the rear of the hatch was perilous. It was recommended that an escape hatch be installed on the left side of the compartment where a camera port was fitted. An emergency air system to open the bomb-bay doors from either the gunner's compartment or the cockpit was also recommended, to allow the gunner to escape through the bomb-bay even if the pilot was incapacitated. Other problems documented could be expected on any new aircraft to service, particularly in the harsh winter climate of the ETO. These included miscellaneous hydraulic failures attributed to swelling valves, cockpit frosting and the freezing and subsequent failure of the A-4 bomb release shackles.[62]

However, landing gear issues became the greatest concern for the Air Technical Service Command and it was felt that Douglas was not responding to the problems. On 27 April 1945 a letter was sent by the command to Douglas. This listed twenty landing gear failures, both of the nose and the main landing gear, since late December 1944, in domestic and combat service. In most cases one of the landing gears had not extended when needed, resulting in a crash landing and substantial damage to the airframe. The letter noted that:

> It is considered that the various changes, which have so far been made to correct the numerous failures and malfunctionings which have occurred, have been in the nature of piecemeal changes, and that no serious attempt has been made to accomplish a thorough and sound redesign of the whole installation which is certainly warranted on the basis of the service records. This is hardly in keeping with the usual Douglas practice of good engineering.[63]

The letter went on to note that two engineering changes, one to strengthen the nose gear and one to redesign the nose



Above: **The other A-26D was s/n 41-39543, shown here with the eight-gun nose and six internal wing guns of the later production A-26Bs. A single A-26C, s/n 44-34776, was modified with the C series engine to become the A-26E. Planned production of the A-26D and A-26E ended with the dropping of the atomic bombs.** John Horne Collection

gear door release mechanism, were in progress at Douglas but that neither seemed to be progressing. Douglas was requested to expedite the engineering changes and any other landing gear modifications, get them on to the production line and begin work on redesigning the entire main and nose landing gear system.[64]

Despite these problems, two supplements to preproduction contracts were approved by the War Department in early April 1945. Supplemental Agreement Number 7 to AC-5140 provided for the production of an additional 1,250 A-26s from the Tulsa plant to be delivered through July 1946. The contract price, including spare parts, data and a 3.75 per cent fixed fee to Douglas, was $106,211,313. The contract did not specify whether or not the Invaders were to be built as A-26Cs or the upgraded A-26Es with more powerful 'C' series engines. The unit cost on the contract was $72,476 and the assigned serial block was 45-53575 to 45-54824.[65]

On 13 April 1945 Supplemental Agreement Number 6 to AC-5141 procured 350 A-26Ds, also equipped with the 'C' series R-2800 engines. The contract cost was $33,344,067, including spare parts, tools, material and a fixed-fee to Douglas. The serial block was assigned between 45-54825 and 45-55174.[66] Thus a total of 7,703 A-26s were under contract, either delivered, on the production line or proposed. As of 30 April, a total of 991 A-26Bs and 643 A-26Cs had actually been delivered to the AAF.

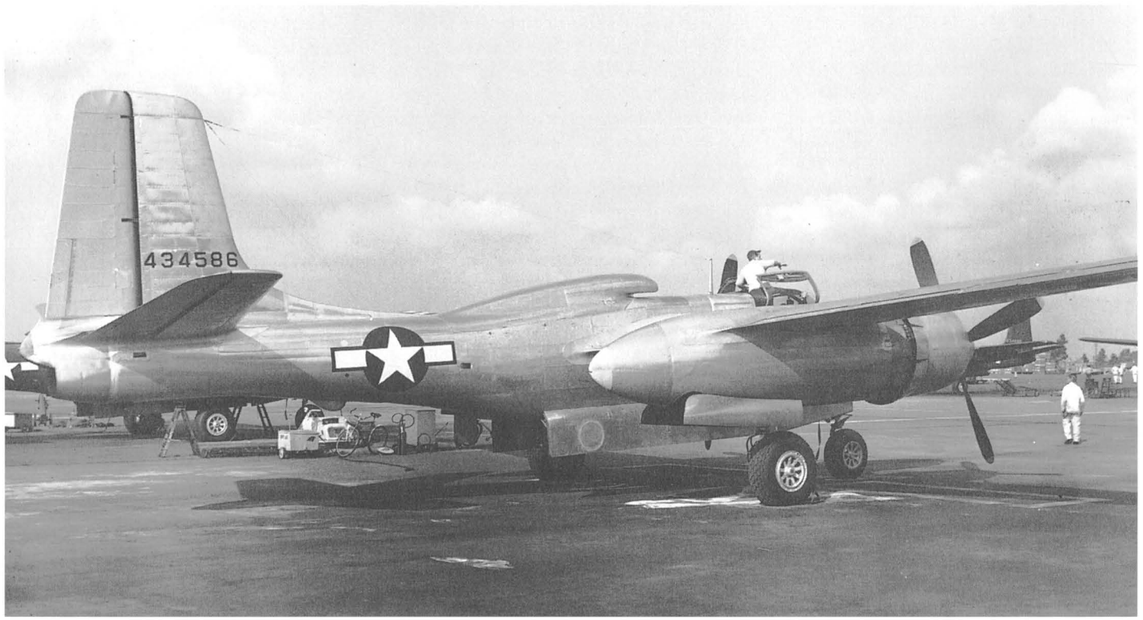
Victory in Europe, War in the Pacific

However, the war news from Europe was overtaking the progress being made at Tulsa and Long Beach and, by late April, the war against Germany was grinding to a halt. As of 8 May (VE Day), five bomb groups in the ETO and Mediterranean Theater of Operation (MTO) had completed their conversion from the A-20 and the B-26 and another three were in transition. These groups had conducted 11,000 combat sorties with the A-26 and dropped more than 18,000 tons of bombs with a loss of only sixty-seven aircraft.

Aside from the jubilation that came with the end of hostilities in Europe there was a rapid reordering of production priorities for all aircraft programmes. The war against Japan was expected to last well into 1946 and possibly 1947. None the less, on 9 May 9 the Assistant Secretary of War requested that the AAF pay particular attention to the B-17 and A-26 production schedule, both of which he considered excessive based upon the developing war situation. Plans called for B-17 production to be cut to a hundred per month by July 1945. The A-26 was programmed to increase deliveries to 400 per month by August and then decline to a sustained rate of 250 per month by February 1946. As the B-17 was not being used in the Pacific and the A-26 had a limited range for Pacific operations, it was requested that both programmes be examined for reduced production rates.[67]

Within a week, AAF Headquarters had responded with a re-evaluation of the production schedule for the A-26. The resulting memorandum laid out the required production rate based upon these assumptions:

Douglas modified one late-production A-26B with the uprated R-2800-83 engine, four-bladed propellers and the installation of a General Electric I-16 turbine engine in the gunner's compartment. The hybrid powerplants were to give attacking aircraft an extra speed advantage when needed. Though the installation was successful, the war ended months before the modification was completed. The sole test aircraft was designated as the XA-26F. Boeing Historical Archives



a. Seven A-26 groups would be redeployed from the ETO and MTO to the Pacific, including one pathfinder group.
b. All medium and light groups deployed against Japan, except three FEAF B-25 groups, would be re-equipped with A-26s.
c. The three B-25 groups in the FEAF would continue to use B-25s until B-25 stocks were depleted, expected at the end of 1946. After that, those groups would re-equip with the A-26.
d. No A-26s would be released through the Lend-Lease program.
e. The Occupational Air Forces in Europe currently equipped with B-26s would be re-equipped with A-26s beginning in June 1946.[68]

Considering these factors, the A-26 would be overproduced by 3,244 airframes at the end of 1946. Thus the AAF requested that the production rate for the A-26 be immediately cut to 150 per month.[69]

Subsequently, contract AC-5140 for the production of 3,250 A-26s at Tulsa was cancelled in its entirety by the government on 31 May.[70] The production of A-26Cs on contract AC-34433 at Tulsa was to be halted at fuselage number 1753 (s/n 44-36450).[71] Any changes not scheduled to be incorporated into the production line before the last aeroplane were cancelled and the Engineering and Tooling Departments at Tulsa was closed. Needed modifications to the A-26s delivered would be accomplished at modification centres after delivery.[72]

For the A-26Bs destined for the south-west Pacific, changes were incorporated into the Long Beach production line to accommodate theatre requests. The two significant changes were the deletion of the lower turret and the incorporation of an additional 125gal (470ltr) fuel tank in its place. These aircraft were delivered in overall olive drab paint, presumably also at theatre request.

As the war effort shifted to concentrate fully against the Japanese, the AAF requested that Douglas modify eight A-26Cs for photoreconnaissance at the Tulsa modification centre. All armaments and most of the bombing equipment were to be removed. Three K-19 cameras, one in the nose and two in the aft fuselage, were to be installed in each aircraft. The bombardier was replaced in the aircraft with a photographer-navigator in the nose section. Provisions to carry photoflash-bombs in the bomb bay would be provided and a D-5 electric flash unit could also be installed in the bomb bay and tail section. Additional avionics, including provisions for *Long-Range Navigation* (LORAN) and *Short-Range Navigation* (SHORAN) systems would be added and a SHORAN navigator would make up the third crew member. The aircraft would be finished in gloss-black night camouflage and redesignated as FA-26 aircraft. The AAF request referred to earlier research done with A-26C s/n 43-22576 by the Engineering Division at Bedford, Massachusetts and similar modifications that were to be incorporated in the FA-26. The aircraft were requested to be delivered to the Pacific Theater by 1 September, an admittedly unrealistic expectation, and so it was indicated that the earliest delivery possible of the eight aircraft was requested.[73] Based on the record, it would appear that none of these modifications were ever completed and the project was cancelled with the end of the war.

The Tulsa modification centre was also assigned a programme to produce a night intruder version of the Invader during the same period. The AAF requested that ninety-six A-26Bs be modified with the addition of a large, self-sealing, bomb-bay tank to extend the aircraft's range to 2,500miles (4,000km). Other modifications included flame-dampened engine-exhausts, a LORAN unit installation, flash-suppressors for the guns, a taxi light installed on the nose wheel strut, and a standard, glossy black, camouflage exterior finish. The extent to which this programme was completed is unknown and it is probable that it too was cancelled when the war ended shortly

A-26 Total Factory Acceptances by Month (Excluding Prototypes)

Month	Long Beach	Tulsa	Total
September 1943	1	0	1
October 1943	1	0	1
November 1943	1	0	1
December 1943	4	0	4
Total 1943	7	0	7
January 1944	4	1	5
February 1944	7	0	7
March 1944	6	2	8
April 1944	10	5	15
May 1944	22	7	29
June 1944	27	12	39
July 1944	21	5	26
August 1944	41	29	70
September 1944	50	40	90
October 1944	55	54	109
November 1944	62	80	142
December 1944	90	80	170
Total 1944	395	315	710
January 1945	100	60	160
February 1945	85	103	188
March 1945	107	175	282
April 1945	97	190	287
May 1945	108	210	318
June 1945	104	175	279
July 1945	104	63	167
August 1945	48	0	48
Total 1/45 to 8/45	753	976	1,729
Total 9/43 to 8/45	1,155	1,291	2,446
Later Miscellaneous	2	1	3
Prototypes			3
Total Acceptances	1,157	1,292	2,452



The XA-26F later became the XB-26F. In 1950 it was bailed to the Shell Oil Company and based at Oakland, California, for a series of tests on aviation fuel. This view shows the aircraft over the upper San Francisco Bay in late 1950 or early 1951. Bob Rohde Collection

afterwards.[74] Additionally, there was another night pathfinder A-26 programme in progress at the Tulsa modification centre utilizing A-26Cs equipped with AN/APQ-13 navigation radar units installed in the forward bomb bay, with large, spherical, antenna radomes extending below the aircraft.[75]

As the production line at Tulsa began to shut down in the summer of 1945, the A-26 found a new advocate. Gen Kenney, commander of the Far East Air Forces and an early critic of the A-26, informed Gen Arnold on 15 July that 'the A-26 with the eight-gun nose and without the belly turret has proven highly satisfactory as a replacement and for the A-20 and later on for the B-25.' He requested that the re-equipping of his 3rd and 417th Group be expedited and that a schedule be sent to him for planning purposes.[76]

In fact, in early July, twenty-one new A-26s were delivered to the 3rd BG, Fifth Bomber Command, while the unit was based at San Jose on Luzon, in the Philippines. Through the first week of July pilots and gunners were introduced to the aeroplanes. In the subsequent ten days five missions were launched against targets on Formosa with the A-26s. Wright Field and Douglas representatives were on hand at San Jose to assist in the transition, no doubt fearful of a repetition of the unsatisfactory combat trials undertaken by the same group a year earlier. Instead, the combat crews accepted the aircraft quickly and enthusiastically. Besides being fast and easy to fly, the massed strafing firepower of the fourteen .50 calibre guns of the gun-nosed aeroplanes impressed the crews.[77] Many 3rd BG B-25Js had been locally modified with up to twelve .50 calibre forward-firing guns, but the A-26 offered a 40mph (65km/h) gain in speed for pressing home attacks. After 19 July the group stood down as it prepared to move to Okinawa to begin attacks upon Japan itself and to re-equip completely with the A-26.

The war suddenly ended on 10 August 10. The dropping of the two atomic bombs on Hiroshima and Nagasaki caught almost everyone by surprise, both the Allies and the Japanese, as the war ended at least twelve months earlier than the AAF had expected. Flush with victory and jubilant that the war had at last ended, the AAF none the less had to make rapid changes in aircraft and *matériel* production. On 13 August the remaining production on contract AC-34433 at Tulsa was cancelled, with Douglas advised to 'immediately stop all work, terminate all sub-contracts and place no further orders …', with the exception of some technical data being provided to the AAF.[78] This cancellation order was modified two weeks later, on 28 August, to allow the completion of one A-26C, s/n 44-35946, that was needed for the night pathfinder programme still in progress.[79]

After the War Was Over

As for Long Beach production, contracts AC-21393 and AC-5141 were cancelled in their entirety on 27 August. The only remnants of the contract to survive were elements that pertained to the development programme under way for the XA-26F for the installation of a turbojet engine.[80] In all, a total of 5,251 A-26s that had been on order in early May 1945 were summarily cancelled, a pattern that was repeated around the country for the major aircraft manufacturers, and, on a wider scale, in all the major industries that supported the war effort.

However, the momentum built up by months of accelerated production efforts could not be easily halted. Dozens of partially completed A-26s sat on production lines. More aircraft were parked on delivery ramps at Long Beach and Tulsa awaiting acceptance by the AAF. Acres of sub-assemblies and raw materials that were being processed into the production lines, along with tooling and other machinery, now sat useless. The employees at the plants were mostly dismissed, save for a fortunate few left to sort out the chaotic process and continue work on the few remaining projects.

At Tulsa approximately a hundred A-26s awaited delivery when production was halted. Of these, sixty-three were actually accepted by the AAF and sent to storage depots. Five of the new A-26Cs were flown direct to Kingman, Arizona, for storage at the Reconstruction Finance Corporation (RFC) yard and were never accepted by the AAF. Of the remaining aircraft, some may have been flown to Long Beach for company storage or, more likely, were scrapped at Tulsa along with the partially completed airframes and the sub-assemblies.

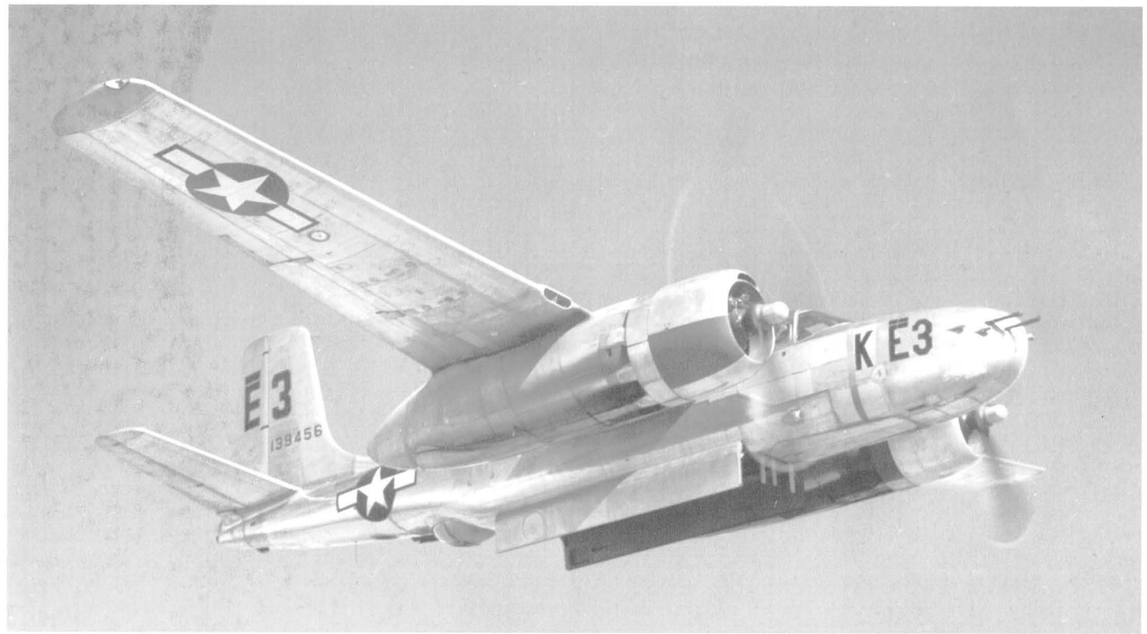
At Long Beach twenty-one new A-26Bs were also flown to Kingman for storage, while another was flown to the RFC storage lot at Walnut Ridge, Arkansas. The remaining aircraft were scrapped at Long Beach, along with the partially completed airframes. All told, of the 5,251 A-26s cancelled, apparently seventy-seven were actually completed by Douglas but not accepted by the AAF. Twenty-seven of these were flown to disposal yards while the rest were scrapped. The last of the A-26s accepted by the military were flown to AAF storage depots, primarily those located at Salinas, California; Grenada, Mississippi; Hobbs, New Mexico; and Lake Charles, Louisiana. Some A-26Bs were also stored at Long Beach, California, for a short time before they were accepted by the AAF.

The last contractual agreements for the Invader programme specified production of the A-26D and the A-26E, upgraded versions of the A-26B and A-26C, respectively. Both versions offered the installation of the improved 'C' series of the Pratt & Whitney R-2800. The Chevrolet-built R-2800-83 powerplants offered 2,100 horsepower for take-off at sea level, boosted to 2,400 horsepower with water injection. Other major changes to the engine included forged aluminium alloy heads instead of the cast aluminium alloy heads of the 'B' series and improved superchargers. The engine change necessitated the installation of new engine mounts, cowlings, carburettors and generators.

Prototypes of each aircraft were modified by Douglas for testing. The first A-26D was modified from A-26B s/n 44-34100 between January and June 1945, and a second, s/n 41-39543, was modified later. (Some sources indicate that the sole A-26D was s/n 44-34776 but this appears incorrect; 44-34776 was not accepted by the AAF until 15 March 1945. It appears to have been stored at Long Beach, with no indications in the records that it was modified to an A-26D. The airframe was scrapped in July 1946.) The sole A-26E was modified from A-26C s/n 44-35563 (Tulsa fuselage number 866). Despite what some sources say, there is no indication that these aircraft received the 'X' suffix of a prototype.

The upgraded A-26D was originally scheduled to be added to the Long Beach production line with fuselage number

A view of the A-26B showing off the long bomb bay. Though designed to carry aerial torpedoes, this capability was not used operationally. National Archives



Douglas Production Test Pilot

William J. Morrisey was a production and engineering test pilot for Douglas beginning in 1942. He was one of the Douglas representatives with the 3rd Bomb Group, both in the summer of 1944 during the initial combat tests and a year later when the A-26 was replacing the A-20s and the B-25s of the group. His recollections of working with the BG in July 1945 come from an oral history provided by the Oral History Archive of the American Airpower Heritage Museum of the Confederate Air Force, Midland, Texas. He died in 2001.

[The A-26] had a not-too-glorious beginning. It was really developed to operate at medium altitude, around 7,000ft [2,100m], but was adapted to the low-level activities that were being conducted in [the] south Pacific. In Europe, the airplane apparently served well at this medium altitude, but the boys in the south Pacific couldn't see the advantages of the A-26. It was difficult to see out of, the hatch was too low, there was not enough firepower. So they rejected it.

Gen Arnold said that this was his airplane; this was the one he wanted developed to really do a job in the south Pacific. The A-20 and B-25 were doing that kind of a job, but not as good as what this airplane was expected to deliver. Consequently, it became my project, my flight test project. With a select group of engineering people, we changed it. Made it a bigger canopy, brought the seats up a little higher, put eight .50 cal guns in the nose and six .50s in the wings. We retained the upper turret. So this was a real gun platform. It, eventually, did a fine job with sixteen .50s firing forward.

Now, Gen Arnold told Mr Douglas one day that 'You don't let this aeroplane [go] without your man in it' – meaning me. So Mr Douglas told me in the privacy of his office and said, 'Bill, look. Nobody knows this except Arnold and you and I. If you turn it down, nobody will ever know about it.' It was about ten days later that I was sitting on the island of Biak beside a sign that said 'San Francisco 8,200 miles from here.' I was out there to demonstrate this airplane. We proceeded on up to the Philippines and the island of Mindoro and joined with the people [3rd BG] who were to operate the airplane, some of which had already been ferried out.

These fellows were good pilots, many of them low time, but they had let loose and they had learned something about flying aeroplanes with the A-20s and the B-25. I was able to demonstrate this A-26 to them in a fashion that they had not yet encouraged themselves to do, such as, with one engine windmilling, full power on the other one, do a full power stall, then to let it roll into a left turn or right turn with the dead engine down and stall it that way. There were a number of other exercises that convinced them that this was a very controllable aeroplane.

Two pilots sat in the jump seats on each demo flight (no dual controls). We got their attention early by cutting one throttle right at lift-off, continuing to raise the gear, putting the needle flaps up, feathering the prop, and climbing to 7,000ft. After the air work and landing, each of them was required to duplicate all this after we switched seats. No duals. Nervous? Who me?

It was a very exciting time to be out there, although I was very serious about it and expected that this would lead to help for them. During the evaluation, we had made a number of missions into Formosa – Taiwan, today. Targets along the coast of Formosa were attacked which demonstrated the effectiveness of all these guns firing forward. Para bombs, of course, were used. The low-level attacks were surprising to the enemy, who had been accustomed to seeing airplanes come in at 200 to 250mph [320 to 400km/h]. We were now able to hit the target at 350mph [560km/h]. It was devastating. Eventually, the enemy had their AAs firing horizontally to try for a hit.

At the final evaluation at Gen Bragg's office at Clark Field, he made the decision that all of the A-20s and B-25s would be supplanted by the A-26 for the invasion of the homeland. A list of changes, that is small changes, nothing major, was handed to me, and I was asked to take this list to the factory to get the changes implemented on to the aeroplanes coming off the line. So I got back home. We started, the changes started on the aeroplanes and were making big progress. Then somebody dropped a bomb ... and that ended the A-26 line. Those nice new aeroplanes were pulled off and cut up with torches.

1166 (s/n 44-34763). However, on 5 June the AAF Procurement Division advised AAF headquarters, that due to delays in the exhaust stack and induction system modifications, the changeover would not occur until fuselage number 1456 (s/n 44-35053) was reached, which was scheduled to be delivered during the first week of November 1945. At that time there was no expected production of the A-26E at Tulsa and the cutbacks of production of the A-26C at Tulsa released enough R-2800-79 'B' series engines to install them on the last A-26Bs at Long Beach. However, subsequent contract cancellations precluded the delivery of any A-26Ds or A-26Es.[81]

In August, even as the production line was shutting down for the A-26B and the A-26C, the AAF and Douglas held discussions on post-war production of an improved A-26. The AAF held a conference with Douglas and its divisions in late August to request recommendations for improvements to the designs. The AAF advised Douglas that, if it were produced, they would like a prototype of the improved version, informally designated as the A-26Z, to fly in July 1946.[82] On 3 September 1945 a tentative programme was established by the AAF and at that time the designations of A-26G for the hard-nosed version and A-26H for the bomber-version were assigned.[83]

Douglas prepared a formal proposal and, on 3 October, the company forwarded preliminary specifications for the 'A-26Z' model to the Air Technical Service Command at Wright Field. It was designated by Douglas as DS-1010 and provided details of two versions of an improved Invader for post-war service. In both versions the A-26 cockpit was raised 7in (18cm) to the level of the upper turret and the canopy was sealed. Access to the cockpit was gained through a hatch in the nose wheel compartment. This provided better egress from the aeroplane in an emergency and eliminated sealing problems of the clamshell-type cockpit hatches. Presumably, the new canopy would be a one-piece, blown Plexiglas cover to provide maximum visibility. A cockpit escape hatch was located aft of the canopy for ditching and belly landings. This cockpit arrangement was also improved by moving all the remotely-controlled radio gear to the aft fuselage.[84]

The proposed A-26Z also offered the latest radio and radar equipment and an increased design load factor of 4.5 g, with a new maximum design gross weight of 32,000lb (14,500kg). The fuselage bomb-bay tank capacity was increased from 125 to 200gal (470 to 760ltr) and droppable wing-tip fuel tanks were offered to increase further the endurance.[85]

The second version of the A-26Z featured the installation of the General Electric I-16 jet engine in the aft fuselage, as in the XA-26F programme. In this version, the turrets were deleted. The I-16 engine could be upgraded to the I-20 engine when it became available. Defensive armament would be a single .50 calibre gun installed in each aft engine nacelle that was remotely controlled by a co-pilot/gunner from a sighting station at the rear of the cockpit. The sighting equipment would normally be retracted but would extend above the fuselage during combat for the gunner's use. Douglas offered that the jet-assisted Invader could fly at 415mph (670km/h) at sea level for a duration of 20min consuming 125gal (470ltr) of fuel. The

AAF and USAF Designation of Invaders in Chronological Order	
Designation	**Remarks**
XA-26	prototype of medium-altitude bomber
XA-26A	prototype of night fighter
XA-26B	prototype of ground-attack/tank destroyer
XA-26C	prototype of attack version with 37mm cannon under bomb bay; not built
A-26B	production designation for ground attack version
A-26C	production designation for medium-altitude bomber version
A-26D	A-26B with R-2800-83 engines; not placed into production
A-26E	A-26C with R-2800-83 engines; not placed into production
XA-26F	single A-26B rebuilt with R-2800-83 engines and I-16 turbojet engine
'A-26Z'	unofficial designation for Douglas post-war A-26 versions
A-26G	upgraded A-26D; not built
A-26H	upgraded A-26E; not built
B-26B	post-1948 designation of A-26B
B-26C	post-1948 designation of A-26C
XB-26F	post-1948 designation of XA-26F
B-26J	post-1962 designation of Navy JD-1
B-26K	remanufactured B-26Bs and B-26Cs in 1964 and 1965 for the USAF, new serials assigned
B-26L	special reconnaissance modification to selected RB-26s in early 1960s
A-26A	post-1966 designation of B-26K

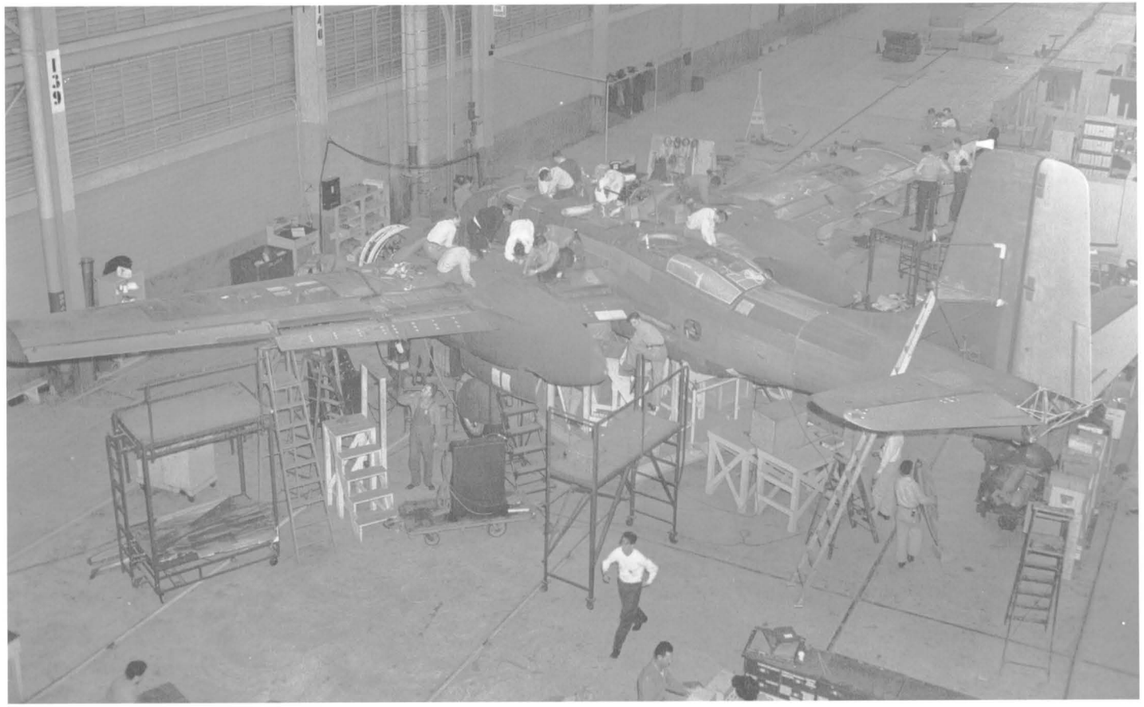
operational weight and drag of the jet engine and intake scoop were offset by the deletion of the two gun turrets.[86]

Douglas offered to produce 125 of the new Invaders for the AAF at a proposed cost of approximately $145,000 per unit for the basic aeroplane or $150,000 per unit for the jet-equipped version. Deliveries could start in the summer of 1946 and increase to a rate of ten per month until the contract was completed.[87]

Unfortunately for Douglas, the AAF responded on 31 October 1945, that, while the proposed A-26Z was a 'distinct improvement over the current A-26 aeroplanes', the AAF decided that there



A early-production A-26B, s/n 41-39221, beating up the Long Beach airport during a test flight. The A-26 was easily the highest-performing, multi-engine bomber in the AAF inventory. Note the lack of armament on this Invader, probably used as a test platform for equipment installations.
National Archives



Above: **Early production under way at Tulsa. This is probably the first production A-26B being assembled in early 1944. As at Long Beach, the first examples were hand-built.** Tulsa Airport Authority



A night-time view of the Tulsa production line in the spring of 1945. By this point, Tulsa was building only the A-26C. Tulsa Airport Authority

was no requirement for additional A-26s in its inventory. No prototype nor additional development were undertaken and the A-26Z programme ended.[88] It is interesting to note, though, that several features of the A-26G were incorporated into what later became the B-26K of the Vietnam War.

One additional factory modification programme for the basic Invader design was the XA-26F that proposed the installation of a General Electric J31 (redesignated from I-16) turbojet engine in the aft fuselage. A-26B s/n 44-34586 rolled from the Long Beach line in late July 1945, but the airframe was diverted to the 'jet booster programme', designated as Project X-32823. Modifications were under way in late August when the Long Beach production contract was cancelled and work on the XA-26F, funded from the contract, also halted. The programme was soon reinstated. To accommodate the turbojet engine, the fuselage aft of the bomb bay was deepened. Both turrets and

A-26C production under way at Tulsa.
Tulsa Airport Authority



the gunner's compartment were deleted and the turbojet engine was mounted aft and below a long air scoop fitted over where the upper turret had one been installed. The turbojet provided thrust through an exhaust at the aft end of the fuselage below and aft of the elevators. Besides the installation of the 1,600lb-thrust (7,120N) J31 engine and the associated assemblies, the aeroplane was also re-equipped with the 'C' series R-2800-83 engines driving four-bladed propellers equipped with spinners. Initial test flights were conducted, however, with the three-bladed Hamilton Standard propellers.

The General Electric J31 engine was a refinement of the Whittle engine developed by Rolls-Royce in Britain. In 1941 the AAF was able to procure production rights for the new design and General Electric was assigned the task of putting it into American production. General Electric was selected as the contractor mainly because of its experience with turbo superchargers and some of the associated metallurgical problems. The original Whittle turbojet engine was the result of design work by Sir Frank Whittle in the late 1930s. General Electric adapted the design for American production and by March 1942 had a prototype engine running. Designated as the Type I Supercharger, General Electric gradually improved upon the design and began a production run of fifteen engines for installation in the XP-59 and YP-59 fighters then under development. By April 1943 the engine had advanced to the point where it was producing 1,600lb (7,120N) of static thrust, this version carrying the designation of I-16 (the '16' denoting 1,600lb of thrust). The engine weight was approximately 804lb (365kg). This was the model selected to go into the XA-26F, though the uprated I-20 engine was slated for the programme. After May 1945 a new engine designation system was put in place and all I-16s subsequently produced were designated as J31 engines. The J31 was designed to burn kerosene and the bomb bay fuel tank was modified in the XA-26F to carry the fuel load.



Yet another indication that there existed some widespread confusion at Douglas over AAF serial numbers for their A-26s. This view shows the first Tulsa A-26B, assigned the serial of 43-22252 but marked as s/n 42-22252. This error is similar to that made with the prototype Invaders at El Segundo. The photograph also indicates that at least one of the Tulsa A-26Bs was completed with the 75mm cannon. One of the Douglas-built B-24s is parked behind the A-26. Tulsa Airport Authority

By early October 1945 most of the modifications were complete. An additional panel was provided to the right of the instrument panel for the turbojet instruments, switches and controls. Initial ground runs of the XA-26F turbojet engine were scheduled for 10 October with a first test flight, made under piston power only, expected by 17 October.[89] A series of flight trials revealed that the augmented thrust of the J31 engine could boost the top speed to 435mph (700km/h) at 15,000ft (4,600m). This compared with 403mph (650km/h) demonstrated by the A-26D prototype and 355mph (570km/h) by the standard A-26B under the same conditions. The gain in performance over the A-26D was not deemed sufficient to warrant further



An early view of a final assembly hangar at the Tulsa facility showing a mixture of A-26Bs and A-26Cs. The first deliveries to the AAF were not made until the late spring of 1944. Tulsa Airport Authority

development. By the time testing was under way in the late fall of 1945, the impetus for the project had already gone.

None the less, the AAF accepted the aircraft on 14 December. A Douglas company test pilot commented that the aeroplane had a tendency to nose tuck at higher speeds, that characteristic being attributed to the large dorsal engine intake disturbing the airflow over the horizontal tail surfaces. It was flown to Wright Field for an additional test programme and remained there until 1949, being redesignated as the XB-26F after 1948. There is a report that the aeroplane was used to set a speed record for carrying a 1,000kg (2,200lb) load over a 1,000km (620miles) course.

In 1949 it was transferred to the Shell Oil Co. on a bailment contract as a flying laboratory for fuel and lubrication research. It joined another Shell aircraft, a B-25J operated as NL2424, at the Shell facility at the Oakland Airport in California. The pilot for the programme, Bob Rohde, recalled that the XB-26F was obtained primarily because it was equipped with the 'C' series R-2800-83 engines and not because it had the J31 installation. Most of the tests were done on behalf of the government and involved blends of high-octane fuel. Furthermore, because the R-2800-83 engines were comparable to those being installed on civil Douglas DC-6s, the research had a commercial application. In one instance, Rohde recalled that the J31 engine being used to test zero-vapour-pressure jet fuel. There was some concern that at high altitudes the zero vapour pressure would not allow a turbine engine to start and, as several contemporary designs, notably the KB-50 and the B-36, were having turbojet engines added, research was required. The XB-26F was flown to high altitude and the J31 engine was started without difficulty.

Shell Oil operated the XB-26F with a crew of three: a pilot, an engineer in the cockpit right seat and a technician wedged into the bomb bay to record and photograph a special instrument panel. Additionally a Sperry engine analyser was installed on the right engine so that detailed engine readings could be taken from it during the test projects. In December 1951 Shell returned the XB-26F to Wright Field as the bailment programme ended.

Subsequent USAF use of the aeroplane is unknown. By May 1954 it was based at the Air Force Cambridge Research Center at Cambridge, Massachusetts. On 12 May the aeroplane was placed into Class 26 and withdrawn from service. It was subsequently delivered to the Lindsey Hopkins Vocational School in Miami, Florida and parked at the Miami International Airport. The government required the aeroplane to receive a civil registration and the CAA assigned N66368 to the airframe. It remained grounded, however, and was undoubtedly used only as an instructional airframe. It was finally scrapped in 1972.

CHAPTER FOUR

Description in Detail

Introduction

The Douglas A-26 was constructed in seven major sub-assemblies: the forward fuselage, the tail section, four sections of wings, the nose section and the tail section stabilizers. It required about 6,500 engineering drawings to convey the design information from the engineers to the Douglas manufacturing division, drawings that ranged in size from 1sq ft (0.09sq m) to roll drawings 3ft wide and 20ft long (1m × 6m). The aeroplane structure, by weight, consisted of the materials shown in the table:

Material	Weight (lb/kg)
carbon steel	622/282
alloy steel (including armour plate)	3,321/1,508
copper, wire and cable	180/82
aluminium, rolled or extruded	10,093/4,580
aluminium, sheet	7,736/3,510

The rolled aluminium spar caps themselves weighed over 4,000lb (1,820kg). The aeroplane contained significant amounts of other material, including 680lb (310kg) of rubber used to build the self-sealing fuel tanks. Approximately 375,000 rivets of all kinds were used in the construction of a single A-26 Invader.[90]

In the 1930s German engineers developed the first heat-treatable aluminium alloy using approximately 4 per cent copper and employed it in the construction of dirigible frames. In general use, the alloy became known as 'dural,' 'duraluminum,' or 'dural aluminum,' all interchangeable terms. Later, the American aluminium company Alcoa developed the 'alclad' process whereby sheet aluminium alloy was produced with a layer, normally 5.5 per cent thick on each side, of high-purity aluminium on the exterior surface. Whereas many aluminium alloys are subject to corrosion, the layers of pure metal provide protection and alclad aluminium alloy became standard in American aircraft construction.

The A-26 used both 24S alclad alloy (now referred to as 2024) and the newer 75S (now 7075) alloy. The 24S duraluminium alloy was composed of 4.5 per cent copper, 1.5 per cent magnesium, 0.6 per cent manganese, with the remainder aluminium. The 75S alloy, on the other hand, was composed of 5.6 per cent zinc, 2.5 per cent magnesium, 1.0 per cent copper, 0.3 per cent chromium and the remainder aluminium. The newer alloy was more difficult to work with as it was much harder but carried more strength for its weight.

What follows is a description of the A-26 derived primarily from the aircraft technical orders.

Fuselage

The fuselage was of semi-monocoque type construction and consisted of an all-metal structure of alclad skin with bulkheads, ribs and longitudinal stiffeners. It was made up of a series of channel-type frames spaced 12 to 24in (30 to 61cm) apart. In highly stressed areas these channel-type frames were replaced by frames built-up from extruded sections and webs. The frames were connected together by aluminium-alloy longitudinal stiffeners that also supported the fuselage skin. The stiffeners were spaced from 4 to 6in (10 to 15cm) apart and extended the entire length of the fuselage sections.

The main fuselage contained the pilot's compartment, bomb bay and the gunner's compartment. The tail section began aft of the gunner's compartment and included the vertical and the horizontal stabilizers. The nose section could either be the bomber nose or the all-purpose gun nose depending upon the aircraft configuration. The assembled length of the fuselage was 50ft 9in (15.5m) for the A-26B and 51ft 3in (15.6m) for the A-26C. The maximum width of the fuselage was 5ft 2in (1.58m). Access bays, or tunnels, were built into the fuselage structure on both the left and the right side to provide external access to wiring,

The A-26 was built with 10,000lb (4,500kg) of rolled or extruded aluminium alloy, 7,700lb (3,500kg) of sheet aluminium alloy and another 4,400lb (2,000kg) of other materials, such as rubber. The empty weight of the aircraft was about 22,300lb (10,120kg). Over 375,000 rivets were used in the construction.
Boeing Historical Archives



hydraulic systems, control cables and other systems. These bays extended from the cockpit to the gunner's compartment and were covered with panels that mounted flush into the fuselage sides and provided easy access to aircraft systems during repair and maintenance.

Cockpit

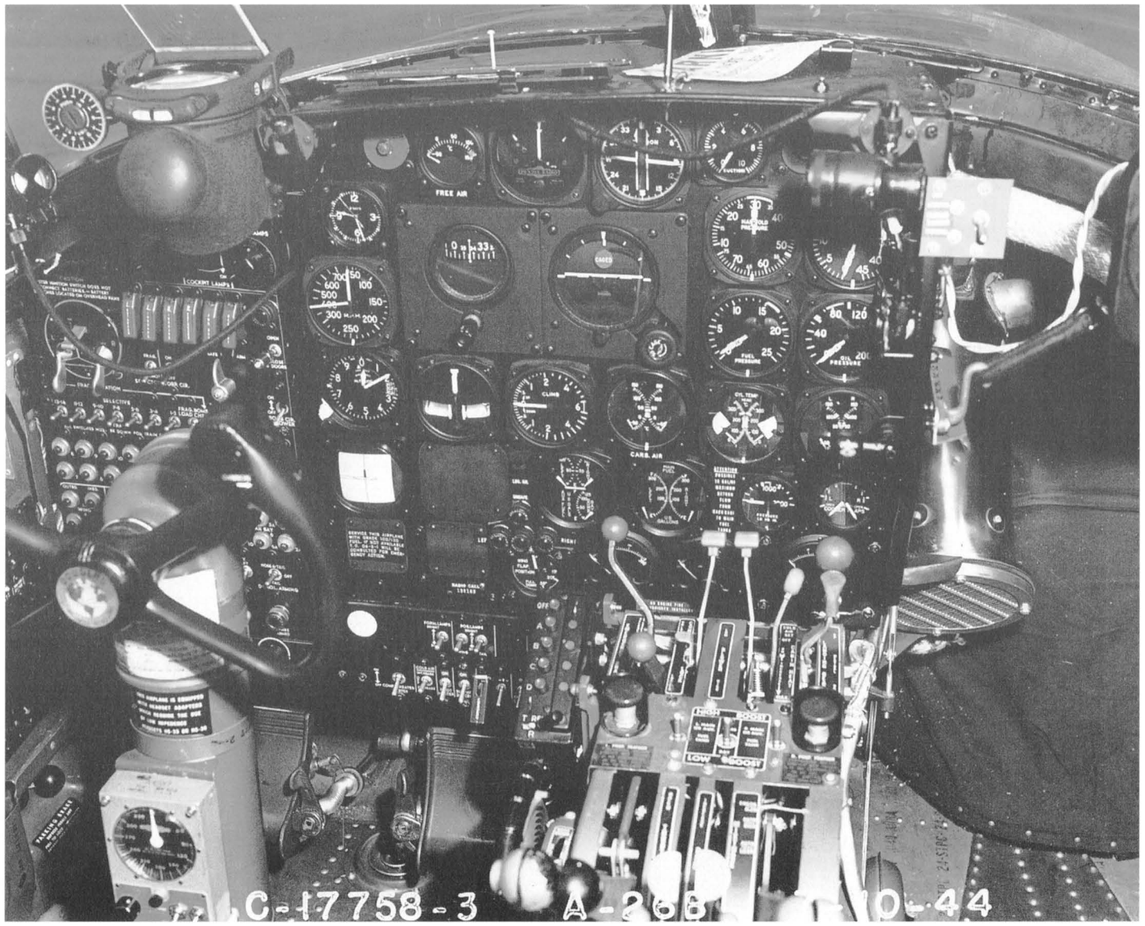
The main fuselage was assembled from two halves, split along the vertical plane. The structure was built on jigs and then joined in the production process. The forward end contained the pilot's compartment. A separately constructed, single-piece pilot's enclosure covered the entire upper cockpit area. The cockpit contained the flight and engine controls.

On the left side of the cockpit was the pilot position and on the right was either a seat or a jumpseat for the gun loader, navigator or co-pilot, depending upon the aircraft's configuration. Access to the cockpit was via the overhead hatch (on early A-26s) or the clamshell cockpit canopy (on later models). These openings also served as the emergency exit. A retractable ladder was built into the right side of the fuselage which, along with steps and handholds, allowed a means to climb from the ground on to the wing and then into the cockpit. If the bomb bay compartment were empty there was also a hatch at the aft end of the cockpit that provided access. Immediately behind the pilot position was an enclosed area that contained oxygen bottles, radio equipment and hydraulic accumulators.

Pilot Controls and Instruments

The cockpit was arranged so that all flight controls were easily accessible from the pilot position. The general arrangement of the cockpit provided for a flight instrument panel mounted immediately in front of the pilot seat. To the left of the instrument panel was the pilot's main

The cockpit of a standard A-26B with provisions for a single pilot. The engine controls are on the central pedestal, flight instruments ahead of the pilot, a gunsight on the glare shield and electrical switches on the left panels. Boeing Historical Archives



electrical control panel. To the right of the instrument panel and extending back on the right side of the pilot's seat was the control pedestal. At the left side of the cockpit was the electrical distribution panel. Above the pilot was the pilot's overhead electrical control panel.

Primary flight control was through the control wheel attached to the control column. The ailerons and elevators were conventionally controlled with the wheel, which also had several switches incorporated for weapons firing and other purposes. Two rudder pedals with main wheel brake controls (right pedal, right brake; left pedal, left brake) were installed on the floor of the cockpit beneath the instrument panel. A duplicate set of flight controls was installed on some production A-26Cs. In this case, the second set of controls was incorporated into the cables and pulley assemblies leading from the cockpit to the flight control surfaces.

The pilot's flight instruments were installed on a shock-mounted panel attached to the fuselage structure with four bolts. The flight instruments provided were conventional in nature. The Pitot-static type instruments included the airspeed indicator, vertical speed indicator and altimeter, all of which used atmospheric pressure readings to provide flight indications. A turn and bank indicator and two gyroscopic instruments were installed: a gyro horizon flight indicator (attitude) and a directional gyro indicator (heading). Both were vacuum-driven. Engine gauges included manifold pressure, propeller tachometer, oil pressure and temperature, fuel pressure, cylinder head temperature and carburettor air temperature. Most of these gauges were dual indicators; that is, each provided an individual indication for each engine. Electrical indicators included a voltmeter and ammeter for each engine generator. Fuel quantity gauges for the main and the auxiliary tanks were also installed on the panel. The general layout of the instrument panel was crowded because of limited space. A large, removable, skin panel located on the left side of the exterior fuselage forward of the windscreen allowed maintenance access to the area behind the instruments.

The engine control pedestal was installed in the centre of the fuselage to the right of the pilot and contained two banks of levers. The aft bank contained, from the left, the engine throttles, the propeller rpm controls and the fuel-mixture controls. The forward bank of levers typically were the engine blower controls, aft being high blower and forward being low blower, the landing gear control, the cabin heat lever and the control locking lever. There was some variation depending on the production date.

The main electrical panel, mounted to the left of the instrument panel, contained most of the switches in the cockpit for lighting, heater, alarm bell, cowl flaps, oil cooler doors and engine magneto switches. Switches on the panel also controlled the propeller anti-ice and windshield wipers. On some aircraft the landing gear switch was mounted on this panel. On later models switches for the bomb racks and wing racks were also included, as well as the bomb salvo handle.

The overhead panel contained the main aircraft battery switches, engine starter switches and engine generator switches. Also mounted on the panel were the engine primer and oil dilution switches. Later aircraft had the pilot's fire-control panel, which selected gun and cannon options, incorporated into the overhead panel.

The pilot's electrical distribution panel, mounted on the left side of the cockpit at the pilot's elbow, contained circuit-breaker-type switches that protected the control circuits routed through the panel. The distribution panel acted as an electrical bus for many of the electrical systems.

Nose Landing Gear

Located beneath the cockpit floor was the nose landing gear. The nose gear assembly was fully retractable and pivoted 90 degrees during the retraction cycle to allow the nose wheel to lie flat in its well. The nose gear assembly was a single-strut, cantilever assembly braced toward the rear of the extended strut. The nose gear was hydraulically actuated and controlled simultaneously with the main landing gear by using the gear selector switch in the cockpit. The gear locked down using a hydraulically-actuated latch assembly; it was held in the retracted position by a hook installed on a beam in the nose wheel well. The nose tyre was a 36in, 10-ply tyre with a smooth casing.

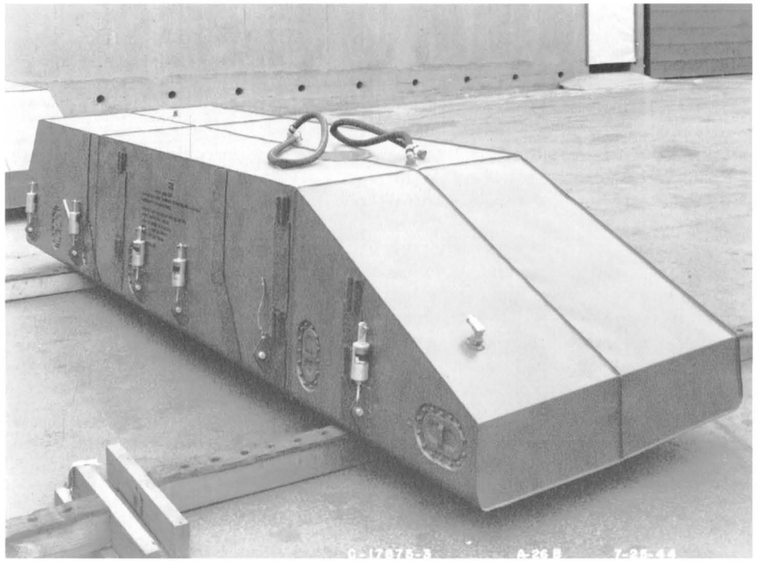
This view clearly shows how the nose gear rotated 90 degrees before retracting aft. This was required because of the limited space between the floor of the cockpit and the bottom of the aircraft. The complicated retraction sequence proved troublesome, however, and the nose gear of the A-26 was considered a weakness of the design. National Archives



A nose wheel snubber was installed and operated as a shimmy damper. The snubber was a small, independently-operated, hydraulic cylinder that absorbed nose wheel shimmies. The snubber was engaged prior to operating the aircraft and restricted the nose wheel to 36-degrees of movement from each side of centre. With the snubber disengaged, the nose wheel was free to pivot 360 degrees for ground handling. There was no provision for nose-wheel steering controls on production Invaders. Ground steering was accomplished with main wheel brakes and differential engine power.

Left- and right-side nose wheel doors covered the wheel well when the gear was retracted. The doors were attached at two hinge points. The right side door was hydraulically actuated along with the landing gear assembly and was mechanically connected to the left side door.

A manual release mechanism was installed to allow the pilot to release mechanically the hook holding the nose gear in its retracted position. This could be used in case the extension sequence did not unlatch the nose gear and was cable operated by a handle located on the left side of the control pedestal in the cockpit.



The A-26 could be equipped with a standard 675gal (2,550ltr) ferry fuel tank that was installed in the bomb bay. This tank was not self-sealing and was not used in combat. It utilized the transfer pumps of the permanent bomb bay fuel tank located above and forward of the ferry tank. The ferry tank attached into the bomb bay using the standard bomb shackles. Boeing Historical Archives

Bomb Bay

Aft of the cockpit compartment was the bomb bay. The forward bulkhead of the bay consisted of the front wing-spar tie plates, also called the spar carry-through structure. The rear wing-spar tie plates effectively divided the bomb bay into a forward and an aft compartment in the top portion of the bay, but the lower part was open longitudinally from the front wing spar to the gunner's compartment, thus allowing the bay to accommodate a pair of torpedoes. The upper part of the bomb bay aft of the rear wing-spar tie plates contained the upper turret. The bomb bay extended 11ft 4in (3.5m) from front to back. Access doors to the pilot's and the gunner's compartment were located on the on the forward and aft bulkhead of the bay, respectively.

Two hydraulically-actuated bomb bay doors enclosed the lower portion of the bay. The control valve for the hydraulics was electrically operated by a switch, but could also be manually operated from the cockpit control pedestal. Two forward bay door actuators and one aft bay actuator, attached to both doors, operated the doors. Electrical switches attached to the aft control links on the bomb bay doors prevented bomb release until the doors were fully open. The right door had removable openings for camera installations. Retractable airflow spoilers were installed forward of the bomb bay and were hydraulically actuated in unison with the bomb bay doors. The spoilers lowered into the slipstream before the doors' opening and retracted after the doors had closed and reduced buffeting caused by the open doors.

Four sets of bomb racks were installed in the bay: two on the right side and two on the left. The forward sets contained three racks per set, while the aft pair contained two racks per set. The installation allowed numerous combinations of bombs to be carried. The maximum load of the bay was 4,000lb (1,820kg), normally achieved by four 1,000lb (450kg) bombs. Alternative combinations were: six of 500lb (225kg), eight of 250lb (114kg), or sixteen of 100lb (45kg). Kits were available to allow the loading of different combinations of fragmentation bombs, two Mk 13 torpedoes or up to four Mk 26 1,000lb-parachute naval mines.

A-26s were equipped with either of two bomb-release systems: an electric release mechanism and a cable salvo release, or an all-electric release and salvo system. Bomb-release controls were located in the cockpit and, if installed with a bomber nose, in the nose compartment also.

Two bomb bay fuel tanks were available for installation. A 125gal (470ltr) fuel cell was installed in the top of the forward bay. It was filled through an opening in the top, left-hand side of the fuselage behind the cockpit. An electric fuel booster pump provided the fuel pressure to feed both engines direct if the fuel selector were positioned properly. A long-range, 675gal (2,550ltr) non-self-sealing ferry tank could also be installed that extended the entire length of the lower bomb-bay area. Combined, these tanks added an additional 800gal (3,030ltr) of fuel capacity. When both bomb bay tanks were installed they worked in unison, with a booster pump installed in the lower tank. The two tanks were connected and filled from the same filler port. The upper tank drained to the lower and both fed into the fuel system through the same fuel lines.

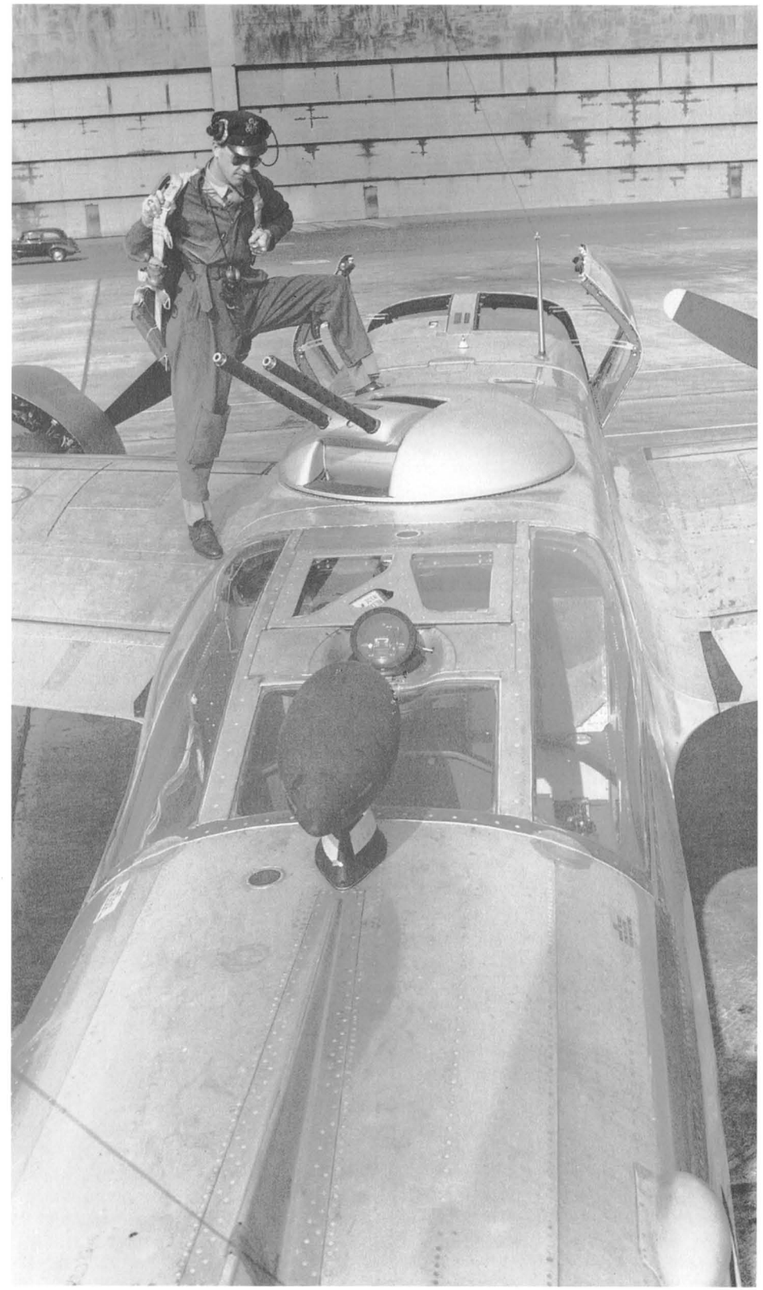
Gunner's Compartment

Directly aft of the bomb bay was the gunner's compartment. The gunner controlled the remotely-operated upper turret, located in the upper aft bomb bay section, and the remotely-operated lower turret, located just aft of the gunner. Access to the gunner's compartment was through a sliding door located on the aft bulkhead of the bomb bay. If the bomb bay was loaded with torpedoes or bombs larger than 300lb (140kg) the only access to the compartment was through the emergency exit hatch located on the Plexiglas enclosure above the gunner's compartment. On some aircraft a Plexiglas escape hatch was also provided on the right side of the compartment; this hatch could be jettisoned from the inside by turning a handle and pushing the hatch out. A removable camera port was also installed on each side of the gunner's compartment.

The gunner's position was at a sighting station built around a periscope-type sight installed vertically in the compartment. His seat was mounted on a circular track around the sighting unit, with a vertical piece of armour plate attached to the assembly for protection. The seat could be rotated in either direction by the movement of the gunner's feet against the compartment floor. As equipped, the seat rotated independently of the sighting unit itself. On later aircraft, however, a power motor was installed to move the gunner's seat and it rotated in conjunction with the sighting unit.

Gun Turrets

Both the A-26B and the A-26C were equipped with two General Electric remotely-controlled turrets, each equipped with two .50 calibre M-2 machine guns and a General Electric sighting station mounted in the gunner's compartment. The General Electric gun sight was equipped with upper and lower periscope heads that extended above and below the fuselage. The gunner controlled and fired both turrets electrically using the gun sighting station equipped with a non-compensating gun sight. The gunner rotated the sighting station to set gun sight azimuth; he rotated gun sight handles around the horizontal axis to set gun sight elevation. The sight itself



This is a Douglas publicity shot showing off the upper gun turret on the A-26B. The view shows the periscopic gunsight optical port emerging through the top of the gunner's compartment and located just forward of the teardrop direction-finding antenna cover. Forward of the gunsight equipment is the gunner's escape hatch. Boeing Historical Archives

maintained a 50-degree field of vision through both the upper and the lower periscope. Some aircraft had 70-degree field of vision sights. The site automatically switched from the upper periscope to the lower and vice versa, based upon the gunner's elevation setting, with a 10-degree overlap between the two periscopes.

The guns in both turrets had 360-degree travel in azimuth. Those in the upper turret elevated from 0 to 90 degrees up; the guns in the lower turret depressed from 5 to 89 degrees down. The overlap permitted a 5-degree crossfire between the two turrets. The maximum rotational speed in azimuth was 45 degrees/sec and 30 degrees/sec in elevation for both turrets.

The General Electric Turrets

The A-26 was one of the first aircraft to employ successful remote-controlled turrets that utilized a fire-control system. The integrated system was designed and built by the General Electric company and was originally earmarked for installation in the Douglas A-20. However, delays in development diverted the system to the new A-26.

The problem of defensive armament for bombers plagued both the Air Corps and aeroplane designers through the 1930s. As that decade began, flexible gunnery had advanced little beyond the ring-type mounts developed during World War I. Manually-drawn machine guns exposed to the slipstream became less and less effective as aircraft performance increased. A method of providing protective cover to the area below and behind a bomber also proved elusive, partially due to aircraft designs restricted by weight and balance considerations that would not allow for a tail gun position. Bomber designs of the 1930s, including the B-9, the B-10, the B-17 and the B-18, all lacked effective rearward defensive armament and usually relied upon .30 calibre guns fired through openings in the floor of the fuselage with limited coverage and visibility.

The Air Corps of the early 1930s emphasized the fixed gunnery of the pursuit aircraft at the expense of the development of workable flexible guns for their bombers. Limited Air Corps budgets for any type of experimental programme also hindered, but the emergence of the bomber as a strategic weapon in the mid-1930s forced the Air Corps to address the problems of flexible gunnery. The Armament Branch of the Material Division at Wright Field was in charge of the development programmes for flexible guns. The Branch studied advanced programmes in Europe, particularly in Britain, where primitive but operative flexible gun turrets had been successfully incorporated into aircraft designs. In 1930 the Bristol Aeroplane Company had produced a manually-rotated, birdcage dorsal turret for one of its aircraft. Four years later the British Overstrand bomber employed a Boulton-Paul single Lewis-gun nose turret that was driven by compressed air. Also under way were developments in hydraulically- and electrically-powered turrets. These efforts exceeded anything being developed in the United States.

The Martin B-10 was the first Air Corps bomber to employ an enclosed turret. First appearing in 1934, the nose turret was manually rotated and could be locked in any one of thirty-six positions for firing. The single .30 calibre gun was mounted in a shock-cord assembly that helped to compensate for the slipstream encountered. Though primitive by European standards, it was a start for the Air Corps. However, it is telling that the 1935 specifications for new Air Corps bombers required only three defensive gun positions equipped with the .30 calibre gun and none for power-assisted or enclosed turrets. The Boeing Model 299 offered more than the minimum; with its five hand-swung .30 calibre guns, it thus became the 'Flying Fortress'.

The competitor for the Boeing 299 was the Douglas DB-1. Designated as the B-18, it offered a manually-operated, dorsal turret that retracted into the fuselage. A single B-18 later employed an experimental powered turret in the nose position, driven by components from a British Vickers turret. The later Douglas XB-19 offered hydraulically-assisted power turrets also employing elements of the Vickers turret drive.

All the early powered turrets suffered from similar difficulties. Control was difficult and jerky; equipment was heavy and bulky; the installation was overly complicated and visibility was lacking. Ballistics information for the machine guns was inaccurate or not available and the turrets presented excessive drag and performance losses. However, American turret development continued, as individual companies apart from airframe manufacturers began to tackle the problem. With the encouragement and, in some cases, financial assistance, of the Air Corps Materiel Division, several companies developed power turret designs. The Sperry Gyroscope Company specialized in a computing unit and a telescopic sight incorporated into a remote turret system. The Bendix Company also designed both a hydraulically- and an electrically-driven turret, while General Electric proceeded with a project to develop remote-controlled tail guns for the B-18.

General Electric enjoyed some success in 1938 with the development of an electric variable-speed drive, called metadyne, that the Armament Branch felt had direct applications in turret drives. In July 1939 General Electric presented the Air Corps with a proposal for the B-18 tail guns that included an amplidyne drive, an improvement over the earlier metadyne drive. A compensating gun sight for the gunner, operating in the upper turret position, was provided that corrected for parallax and gun ballistics, but range, air speed and target speed were entered as constants.

As new turrets were developed, the requirement for an overall fire-control system was obvious. Particularly for remote turrets, central fire control was needed to reduce the number of gunners and to increase the efficiency of the defensive guns. Remote turrets were also attractive for their low profile drag and installation capability on pressurized aircraft. Sperry and General Electric both pursued research and development on such systems. Sperry was charged with developing a system for installation in the B-17C in 1940, with both dorsal and ventral turrets envisioned. General Electric proceeded with a project to develop a system for the Douglas A-20, based upon the tail gun project already designed, but not used, on the B-18.

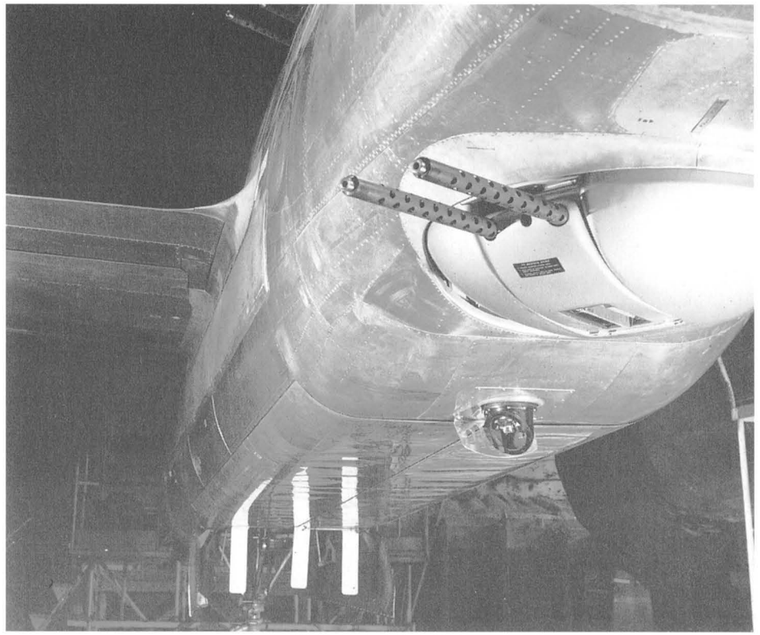
In June 1940 the Materiel Division negotiated a contract with General Electric to develop a fire-control system for tail- and aft-firing nacelle guns for the A-20 for $50,000. Problems of working the three gun positions into the A-20 design caused insoluble weight and balance problems. The following month the specifications were changed to a dorsal and a ventral remote turret and nacelle guns utilizing a single gunner position with a double-ended periscope sight in the aft fuselage. In August the nacelle guns were eliminated from the specification completely. This was the system that was eventually installed in the A-26.

Central to the General Electric programme was the development of a double-ended periscope with a single eyepiece sighting station, developed for the company by the Bausch & Lomb optical company. General Electric attributed the ingenious idea for the sighting station to a Douglas engineer in 1940. The turrets themselves utilized the General Electric amplidyne drive with selsyn controls running on AC power. The turret system thus required a dynamotor to produce AC power from the aircraft DC system. The turret drives were designed to provide a 60- degree/sec azimuth speed and a 40-degree/sec elevation speed, though specifications for the A-26 installation indicated 45 and 30 degrees, respectively.

Other features of the A-20 turret design included a continuous feed ammunition system. A fabric belt lifted shells to the gun. When the guns were fired, an additional circuit powered a drive which wound the fabric belt, thus acting as a booster system for the gun feed. However, the armament system was not developed as fast as the A-20 programme progressed. It became apparent in the fall of 1940 that the system would not be ready for the initial batch of Air Corps A-20s and Douglas incorporated hand-held machine guns into the design. It was expected that the turret system would, however, be ready for the A-20A and a $60,000 contract was signed in December 1940.

Other airframe manufacturers watched the development of the General Electric system with interest and Northrop incorporated a derivative of the A-20 system into its P-61 design, using a single four-gun dorsal turret and, eventually, one of the North American B-28 prototypes also utilized the GE system.

Shortcomings were noted in the limited scanning area provided with the periscopic sight, and gunner orientation suffered without a revolving seat or a target locator; both items were supplied with later versions of the turret system. The General Electric system was actually installed on the single XA-20F beginning in early 1941. However, it was obvious that the system was ideally suited for the A-26 programme and was incorporated from the start into the new design. From January 1942 General Electric was under contract to provide 503 systems for the A-26 (first production contract and three prototypes), as well as 215 for the Northrop P-61, two for the North American B-28 and 402 for the later-cancelled Martin B-33. Production A-20s would eventually have a locally-controlled power turret installed in the aft gunner's compartment.



The lower remote gun turret was essentially the same as the upper turret, only inverted. Just forward of the turret is a Plexiglas cover over the optical port for the periscopic gunsight. The cover could be cleaned with alcohol routed via tubes from a hand pump in the gunner's compartment. The three blades extending from beneath the fuselage forward of the bomb bay were retractable air spoilers used when the bomb bay doors opened. Boeing Historical Archives

The gunner could rotate the sighting station in any direction for the purpose of scanning. When the gun sighting station was engaged with a turret by turning the turret power 'on', the guns in the turret moved in correspondence with the sighting station. While engaged, every motion of the sighting station was mirrored by the turret(s).

The heart of the system utilized four General Electric selsyn generators on the sighting station that were mirrored by four selsyn control transformers on each turret. Each selsyn unit acted as a comparator between the gun sight and the turret, bringing them together as a function of electrical current. On each turret two selsyn transformers controlled azimuth, with a one-speed unit providing for large azimuth changes and a second, thirty-one speed unit providing for any small azimuth changes of the gun sight. A similar input was provided for the turret gun elevation.

A fire interrupter assembly was incorporated into the turret design that prevented the guns from firing into areas of the wing, empennage and propeller arcs. The interrupter consisted of a cam and turret follower that opened the electrical circuit and prevented each individual gun from firing when it passed through an area to be protected. The turrets also had switches that limited the travel of the guns in elevation. If the guns were lowered (or elevated) to the horizontal stop, a limit switch electrically cut power to the firing circuit and reduced the elevation motor drive power by 75 per cent. The remaining power driving the motor was sufficient to hold the guns depressed (or elevated) against the stop.

The gun turrets were also equipped with an airframe contour follower. These assemblies prevented the guns from touching or damaging any part of the aircraft as they swung through their usable area. For the lower turret, the contour follower protected the fuselage area forward of the turret. For the upper turret it protected areas both aft and forward of the turret installation. When the turret guns approached the contour-follower stops, power to the elevation drive motor was reduced by 90 per cent, enough only to hold the guns against the stop but not drive the guns further.

The upper and the lower turret assembly were essentially identical in construction and operation. The most significant difference between the turrets, aside from the lower turret being installed inverted, was that the lower had provisions to eject shell casings through the turret dome as the guns fired. Each turret could hold a maximum of 1,000 rounds. As fully equipped when installed each turret assembly weighed 311lb (141kg).

On early A-26s with the flat canopy, the upper turret could be locked in a straight forward position and control of the gun firing transferred to the pilot. The transfer of control was done via a switch in the gunner's compartment and the pilot could then select the upper turret guns for use in conjunction with or separately from the other forward firing guns. When the pilot had control of the upper turret, the gunner still retained control of the lower one, using his sighting equipment. On A-26s fitted with the bulging canopy the contour follower protected the canopy from the guns, thus they could no longer be fired from the fully depressed position while locked forward.

The pilot was also provided with a device in the cockpit called the 'tell-tale indicator' that depicted the position of the guns in both turrets. With this information, the pilot could manoeuvre the aircraft to provide the gunner with the best defensive use of the guns and to keep the firing direction clear of areas protected by the firing interrupters.

The turrets and the fire-control system required alternating current power for operation. The direct current output from the aircraft generators powered a dynamotor installed aft of the lower turret that produced 115V of alternating current (VAC) at 400 cycles/sec for the system.

On selected A-26Cs that were modified to carry radar, both turrets and the sighting station were removed. On some other aircraft, particularly those used in the Pacific, the lower turret was removed and replaced by a 125gal (470ltr) self-sealing, auxiliary fuel tank. This tank was identical to the one installed in the upper, forward bomb bay. The tank, if installed, was equipped with an electrical fuel transfer pump wired to the cockpit. The fuel lines were plumbed to the upper bomb bay tank.

Fuselage Aft Section

Beginning at a point just behind the lower turret was the fuselage aft section, bolted to the adjoining bulkhead of the main fuselage at Station 352. The section provided for the attachment points of the vertical and the horizontal stabilizers. It also housed radio, heating, ventilating and photographic equipment. An access door for maintenance and inspection was installed just aft of the lower turret, with another camera port located adjacent to the access door. A tail cone assembly, attached with four bolts, was located at the extreme rear of the fuselage. A Plexiglas cover at the end of the tail cone covered the position and tail cone signal lamps installed in the tail cone. A tail skid was attached to the lower section. The skid was constructed of moulded Neoprene, capped by 0.125 sheet steel and riveted to the fuselage structure.

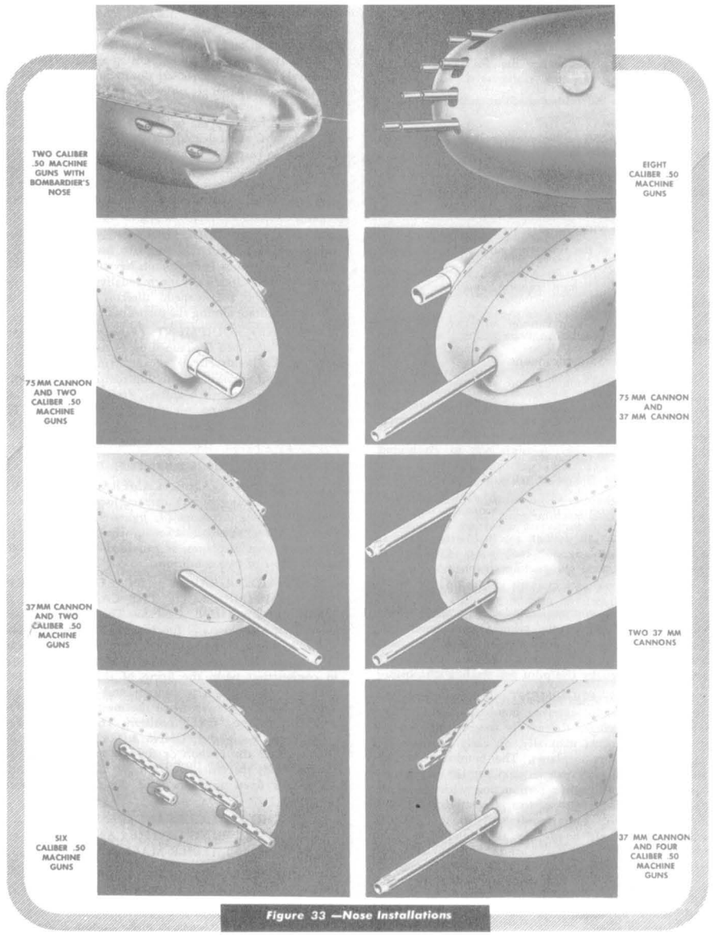
Stabilizers and Tail Control Surfaces

The single vertical stabilizer was a rigid, metal assembly covered with alclad skin and weighed approximately 140lb (64kg). The stabilizer was secured to the fuselage aft section at three points with five bolts that projected from the fuselage and met corresponding holes on the vertical stabilizer. Nuts secured the assembly. Small, removable panels at the base of the stabilizer provided access to the nuts. The vertical stabilizer was capped with a metal tip held on by screws. A de-icer boot could be attached to the leading edge of the stabilizer. Also attached to the vertical stabilizer on early aircraft was a Pitot tube for the airspeed indicators and an antenna attachment fitting.

Attached to the aft end of the vertical stabilizer at two hinge points was the fabric-covered rudder. A gap seal was installed between the rudder and the stabilizer. The rudder deflected from the centre point by approximately 17 degrees. It was connected to the flight-control system via a rudder torque tube at the rudder base. The rudder was controlled conventionally by cables extending from the rudder pedals located in the cockpit. A metal rudder trim tab was installed on the bottom of the rudder and was set by a trim tab handle in the cockpit. The handle was connected to the tab via cables and a gearbox located at the forward end of the lower rudder. A metal plate on the rudder provided access to the gearbox for maintenance. Rudder trim could be set by the pilot to deflect up to 20 degrees from the centre point.

The horizontal stabilizers were two metal structures covered with alclad and each attached to the fuselage by nuts that secured to four bolts extending from the fuselage section. They were set with a 10-degree dihedral and spanned a length of 23ft 1in (7.0m). The maximum chord of the stabilizers was 7ft 5in (2.3m). Each stabilizer had a metal tip secured with screws. The stabilizers could also be equipped with rubber de-ice boots.

The two fabric-covered elevators were each attached to the aft surface of the horizontal stabilizer by two bracket assemblies. The pivot point of the elevators was 8in (20cm) aft of the leading edge of the elevator to provide an aerodynamic balance to the control surface. The elevators could deflect a maximum of 30 degrees up and 14 degrees down. The openings between the stabilizer and the elevators were, as for all the other control surfaces, covered by gap seals.



This excerpt from an A-26 pilot's manual depicts the various installations possible with the all-purpose nose. Only three installations were used operationally: the bombardier nose, the eight-gun nose and the six-gun nose.

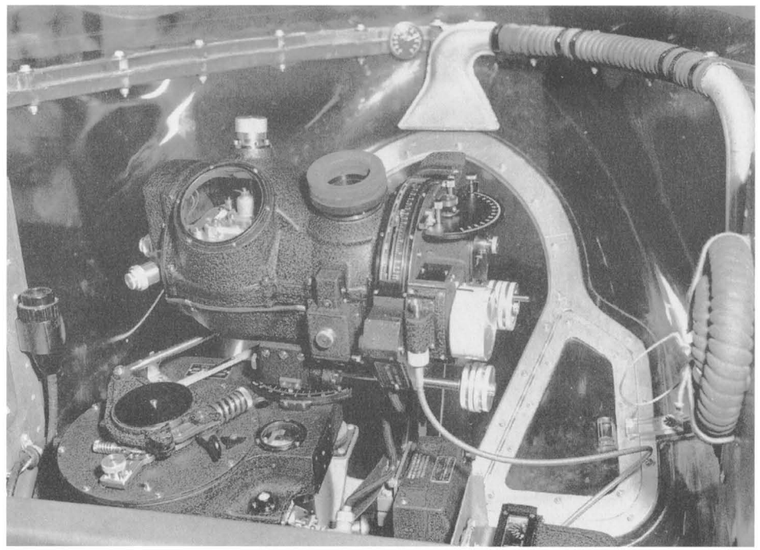
The elevators were controlled by conventional cables connecting them to the pilot's control column in the cockpit and moved in unison. The elevators were connected to each over with a torque tube to which the control cables were attached. Moving the column back raised the elevators while pushing the column lowered them. A metal trim tab was provided on the inboard trailing edge of each elevator. The metal tabs operated simultaneously and were controlled from the cockpit by a trim tab wheel control. The tabs could deflect 12 degrees up or 17 down to provide pitch trim for the elevator controls.

Nose Sections

One of design features of the A-26 allowed the nose section to be changed easily to accommodate mission demands. It was planned to be an easy task to change from the medium-altitude configuration with the bombardier nose, to an attack aircraft with multi-gun installations or a tank destroyer with a 75mm-cannon installation. In practice, nose sections were rarely changed and the 75mm cannon was not used operationally.

Both the bombardier nose and the all-purpose nose were attached to the forward cockpit bulkhead with six steel bolts. The bulkhead, designated as Station 0 for all fuselage measurements, was armoured as





Above: **This view shows the crawlspace between the right side of the forward cockpit and the bombardier's position on the A-26C. The canvas cover on the right side of the compartment covers the pair of .50 calibre guns installed. Some A-26Cs had dual controls; for these aircraft the rudder pedals and control yoke could be removed to allow access to the nose. Bombardiers were not supposed to ride in the nose for take-off or landings due to the unpredictable nose gear of the Invader.** Boeing Historical Archives

Right: **The bombardier's position on the A-26C with the bomb sight installed. Different sights were available but the standard installation appears to have been the famous Norden model. The window on the right side of the flat bomb sight glass was to allow the bombardier to clean the glass from the outside.** Boeing Historical Archives

part of the 75mm cannon installation. Both the bombardier and the all-purpose nose had dural deflector plates installed with rivets or screws to provide protection from angular machine-gun fire.

Bombardier Nose

The bombardier nose was one of two interchangeable units available for the production aeroplane. The upper half of the bombardier nose consisted of Plexiglas. The bottom and the side skins of the nose were made of 5/16in thick dural deflector plating for crew protection. The forward end of the lower nose section was also Plexiglas, with a bomb sight window made of laminated glass. To the right of the glass window was a hinged panel that opened to allow the cleaning of the exterior of the bomb sight window. Also installed on the exterior of the window was a small windshield wiper.

The bombardier's electrical panel was located on the left side of the compartment and contained switches for the operation of the bombing equipment. Forward of the bombardier panel were flight instruments providing airspeed and altimeter information, a bomb intervalometer for sequencing bomb release, a bomb sight mount and a bomb release push button switch. A-26s were prewired to allow the installation of the intervalometer in the cockpit for aircraft with the all-purpose nose installed. The Norden bombsight was commonly used with the A-26.

On the right side of the bombardier nose were mounted two M-2 .50 calibre machine guns. These were electrically fired by the pilot. Ammunition for them was fed by flexible chutes from four ammunition boxes installed underneath a seat cushion that served as the bombardier's crew position. Each box held 200 rounds. Ejected cases from the guns fell into the nose section interior.

A hatch was installed beneath the bombardier nose to allow access to the compartment from the ground. It was hinged at the rear and provided the emergency exit for the bombardier or other crew men in the nose section. Access to the nose section was also provided by a crawl tunnel on the right side of the cockpit that led below the instrument panel and through the forward bulkhead. On those A-26s equipped with dual controls, the co-pilot's control wheel could be removed to allow more room for movement between the nose and the cockpit. A kneeling cushion was provided for the bombardier when he was using the bombsight.

Although the bombardier nose was designed to hold only one crew man, it was common practice for crews transitioning from the B-26 Marauder also to carry a navigator in the nose section. Crew men soon learned that the nose section was not the place to be during landing as the A-26 developed a reputation for nose-gear failures and collapses.

All-Purpose Nose

The all-purpose nose section was developed to provide a variety of armament installations in the attack version of the A-26. Much of the early delay in the development of the Invader centred in continual Air Corps changes to the armament requirements. The all-purpose nose was the solution to provide maximum versatility for field units.

The nose section was constructed entirely of aluminium and steel. Located on either side of the nose were large access panels held by Dzus fasteners. Two other smaller gun-access panels, also held by Dzus fasteners, were located below the large panels. At the bottom of the nose was an access door similar in construction to the hatch used on the bombardier nose. The lower door could be used to hoist ammunition boxes into the all-purpose nose. Seals between the nose and the cockpit section were provided to prevent smoke and gases from fired guns from entering the cockpit. The forward, centre panel in the nose compartment was armoured for gun and ammunition protection.

As developed, the all-purpose gun nose could accommodate any of the following combinations of armaments:

- Six-gun nose: two Type M-2 .50 calibre guns installed on the left hand side; four Type M-2 .50 calibre guns mounted on the right-hand side with all guns in a horizontal plane. Each gun was provided with 400 rounds for a total of 2,400 for the installation.
- Eight-gun nose: four Type M-2 .50 calibre guns installed on the left-hand side; four Type M-2 .50 calibre guns installed on the right-hand side (guns mounted through the centre section of the forward nose in two vertical planes). Each gun was provided with 360 rounds for a total of 2,880 for the installation (the eight-gun nose was a later development and was not available on the early nose design).
- One Type M-9 37mm cannon installed on the left side; four Type M-2 .50 calibre guns installed on the right side. The cannon was provided with a maximum of 75 shells and each gun with 400 rounds of ammunition.
- Two Type M-2 .50 calibre guns installed on the left side; one Type M-9 37mm cannon installed on the right side. The cannon was provided with a maximum of 75 shells and each gun with 400 rounds of ammunition.
- One Type M-9 37mm installed mounted on the left side; one Type M-9 37mm cannon installed on the right side. Though not specified, it appears that each cannon was provided with a maximum of 75 shells.
- Two Type M-2 .50 calibre guns installed on the left side; one Type T-13E1 75mm cannon installed on the right side. The cannon was provided with 20 shells and the guns with 400 rounds per gun.
- One Type M-9 37mm cannon installed on the left side; one Type T-13E1 75mm cannon installed on the right side. The 75mm cannon was provided with 20 shells and the 37mm cannon with 75.

Despite the months of delay and engineering hours spent developing the all-purpose nose section, production A-26Bs used only the first two installations: the six- or eight-gun nose. There is no indication from the record that any 75mm or 37mm cannon-equipped A-26s ever saw combat or even reached front-line units.

As designed, the Type M-2 .50 calibre guns and the Type M-9 37mm cannons were electrically fired from the cockpit. The .50 calibre guns were pneumatically charged from air tanks installed near the guns. The 37mm cannons were manually charged. The stated firing rate of each 37mm cannon was a maximum of 140 shells per minute.

In the eight-gun nose the guns were mounted on brackets that were attached to a large piece of steel tubing running diagonally through the nose section. On the six-gun nose aluminium alloy mounts were used to install the guns, each holding



two guns in a staggered position. In all cases, the M-2 guns were installed with blast tubes through the nose-gun ports. Armour plate was installed in the nose section to protect the guns and the ammunition boxes. Flexible ammunition chutes fed each gun installation from the ammunition boxes.



Above: **For those A-26Bs equipped with a 75mm cannon, shells were carried in a rack ahead of the gunner, who sat beside the pilot straddling the gun just behind the breech. Twenty shells could be carried. Variations of the shell holders included those constructed with fabric.** Boeing Historical Archives

Right: **There was much variation in nose armament on the early A-26Bs. This version depicts a 37mm cannon installed on the left side of the nose, probably paired with four .50 calibre guns on the left side. The camouflage paint suggests this was one of first few production Invaders delivered at Long Beach and probably retained for installation variations.** Boeing Historical Archives



Another installation option for the gun nose was a pair of 37mm cannon, each provided with up to seventy-five shells. There is no indication that any A-26 entered combat with anything other than six or eight .50 calibre gun noses. Boeing Historical Archives

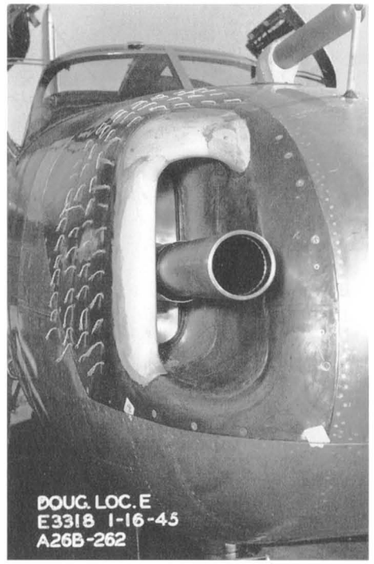


The Type T-13E1 75mm cannon extended from the nose section back into the cockpit through the opening in the right side of Station 0. The total cannon installation was 11ft (3.4m) long. It was manually loaded by a gun loader and electrically fired by the pilot. The gun loader sat on the right side of the cockpit next to the pilot. He had a small seat mounted on the aft end of the cannon with his legs straddling the cannon breech. An ammunition rack holding twenty 75mm shells was bolted above the cannon in the forward cockpit. Spent cannon shells were ejected into a shell-case catcher mounted in the top, forward section of the bomb bay immediately behind and below the gun loader.

The cannon mount was bolted to the floor of the cockpit just aft of Station 0. A vertical levelling clevis at the aft end of the gun provided boresighting adjustments. The opening in Station 0 through which the cannon protruded was covered by an armoured panel. A dust and gas seal was clamped to the cannon barrel and attached to the panel. The normal recoil of the fired cannon was 21in (53cm). The entire cannon assembly, including ammunition, weighed a total of 1,296lb (588kg). In spite of the fact that at one time the AAF specified that each of the first 500 A-26s would be equipped with the 75mm cannon, few were actually delivered with it.

A Type N-9 gun and bombsight and a Type A-3 gun and bombsight head were mounted on the instrument glare shield directly in front of the pilot. The gun and bombsight consisted of a reflector, lens, reticule and adjustable mirror. The pilot fired the cannon by pressing the trigger underneath the left-hand side of the pilot's control wheel. The machine guns were fired by pressing a trigger underneath the right-hand side of the control wheel. The pilot's fire control panel was installed above and aft of the instrument panel on early models and on the overhead panel on later ones. The panel contained master gun safety and camera switches, 75mm cannon switch, 37mm cannon switch, .50 calibre nose gun switch, .50 calibre wing gun switch, upper turret gun switch and gun heater switch. The switch settings determined which weapons fired when the appropriate trigger was depressed.

The six gun nose was the standard installation on production A-26Bs, until the advent of the eight gun nose. Boeing Historical Archives



This view shows another test installation of the 75mm cannon, this one allowing the weapon to be depressed 15 degrees, presumably to increase accuracy. The airflow tufts were added for aerodynamic testing. Neither the 75mm nor the 37mm cannon were installed for combat A-26s. Boeing Historical Archives

Wing Sections

The A-26 wing was fabricated in four sections: major left and right panels that contained the engines and engine nacelles and two small outboard wing tips. The wing was of cantilever construction, using a new, NACA low-drag, laminar-flow aerofoil section. Each major right and left panel was built around two full-span wing spars attached with steel pins and bolts to the spar carry-through structure located in the fuselage section bomb-bay. The two spar assemblies for each wing consisted of eight milled spar caps, four lower and four upper. The upper and lower inboard sections of each assembly extended from the fuselage structure to a point about 6ft (2m) from the wing tips, tapering in width and depth. At the outboard edge they butted against the other four spar cap sections, two upper and two lower, that extended to the end of the wing. The corresponding upper and lower caps for each assembly were joined by sheet alclad aluminium for stiffness, with wing ribs and other structure riveted on to the spar assembly structure. Each of the spar cap sections was milled from aluminium alloy stock by specialized automatic machining equipment. The leading edge of the wing was attached to the forward spar and the flaps and ailerons were installed aft of the rear spar. Each large engine nacelle was built into the wing below the spars. The wing featured chordwise stiffeners and heavy aluminium alloy skinning between the forward and the aft spar to allow inflight wing deflections without skin wrinkling, helping to preserve the laminar flow of the aerofoil.

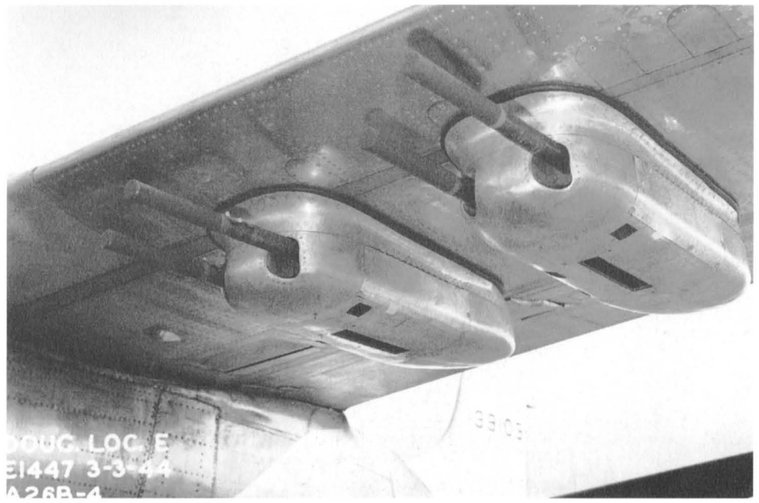
Aerodynamically, the aerofoil was a NACA 65, 2-215 section and spanned 70ft (21m). The wing chord at the root was 128in (3.3m), tapering to 58in (1.5m) near the wing tip. the dihedral of the wings was 4.5 degrees and the angle of incidence of the aerofoil was 2 degrees at the wing root. The wing area, including ailerons, was 540.5sq ft (50sq m). Extending the wing flaps provided an additional maximum 51sq ft (5sq m) of wing area for take-off or landing.

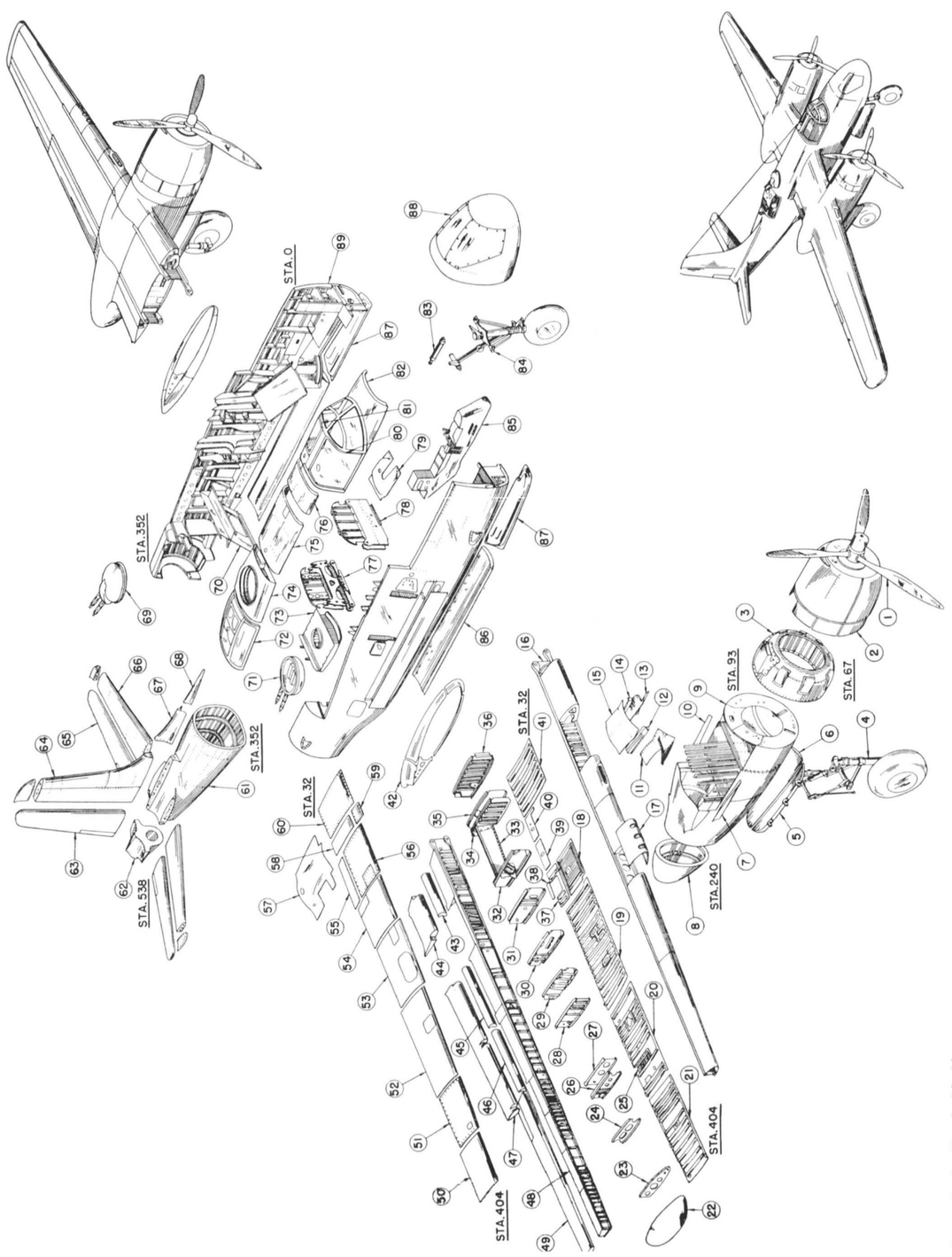
The inboard wing section between the nacelle and the fuselage contained a self-sealing auxiliary fuel tank with a capacity of 100gal (380ltr) installed between the forward and the aft spar. It was serviced through a single filler port located atop each wing just inboard of each engine nacelle. Located just outboard of the nacelle in the leading edge of the wing was an air scoop that provided ram air for the oil-cooler radiators installed between the wing spars aft of the air scoop. Cooling air was ducted through the oil radiators and exhausted through an oil cooler door installed beneath the wing aft and outboard of the nacelle. This door position controlled the system airflow and thus the oil temperature. The door was manually controlled by the pilot on early Invaders; later installations provided automatic control of the system by a thermostat. Maintenance access to the oil coolers were provided by a removable panel located on the underside of the wing.

Outboard of the oil cooler were installed ammunition boxes that held machine gun belts feeding either three internally-mounted .50 calibre guns or four .50 calibre guns installed in two pods beneath each wing. This section had two small hinged doors on top of the wing to provide access to the ammunition boxes for servicing. Between these access doors was a large removable gun compartment access cover. Also installed on later Invaders were small air tanks used to pneumatically charge the wing guns.

Water tanks were installed between the ammunition boxes and the outboard end of the wing panel for later Invaders that

The under-wing gun pods constituted an early attempt to add additional firepower to the A-26. However, they decreased the performance by 25mph (40km/h). The internal wing guns later replaced the gun pods. Boeing Historical Archives





Source: Boeing Historical Archives

had water-injection systems on their engines. Each injection tank was connected to a water pump located on the aft surface of its respective engine firewall. The 21.5gal (81ltr) tank had a filler port located on the upper surface of the wing and also contained an immersion heater to prevent the water from freezing.

On the underside of each wing were two sets of hard points designed to accept bomb racks, chemical tanks or external machine guns. When bomb racks were installed, each rack could carry a single 100, 300 or 500lb (45, 136 or 230kg) bomb, thus increasing the load by a maximum of 2,000lb (910kg) over the maximum 4,000lb (1,820kg) load carried in the bomb bay. The bomb racks contained an electrical release mechanism and, in some cases, a manual release cable. Chemical tanks could be installed on the bomb racks, electrically actuated or released as needed.

The provision to carry externally-mounted guns under the wings allowed for the installation of two sets of twin .50 calibre M-2 guns in faired packages that attached to the hard points. Each gun was fed from the internal ammunition bays that also fed internal wing guns if installed, with the ammunition feed chutes extending through a single opening in the lower wing surface for each pair of guns. Each gun was charged pneumatically from air tanks in the outer wings and electrically actuated from the cockpit. Each gun was provided with 300 rounds or 1,200 per wing.

Later A-26 wings were also built to accept post-type rocket launchers. Using an installation kit, each wing could be equipped to carry seven 5in High Velocity Aircraft Rockets (HVAR), or 5in or 3.5in Aircraft Rockets (AR). Using adapter rails, 2.25in Sub Calibre Aircraft Rocket (SCAR) or 4.5in M-8 rockets could also be carried. The post-type launchers were incorporated into eight launcher plate assemblies (four for each wing). These were attached to the wing by removing selected screws from the wing under surface that matched the plate assembly holes. Located between the corresponding posts were electrical connection screw holes prewired into the fire-control system. When the kits were installed the rocket-firing and release solenoid wiring was attached to these screw connections. The pilot fired the rockets by using the cockpit fire-control panel and the bomb-release toggle on the control wheel.

On some later A-26s provisions were made to carry 165gal (625ltr) droppable fuel tanks just outboard of the each engine nacelle. The tanks were hung from hangar rack assemblies bolted on to hard points on the wing under surface. The hanger rack assemblies each included a fairing covering the installation, an electric fuel-transfer pump, electrical connections to the release shackles and associated lines and fittings. The breakaway fuel line was plumbed from the drop tank to the main fuel tank installed in the engine nacelle. The fuel-transfer pumps were controlled from two switches on a bracket attached to the pilot's auxiliary electrical panel in the cockpit. Three switches were also installed on the pilot's main electrical panel: two controlled the release shackles for dropping the tank while the third was a safety switch.

Each wing had a landing light installed on its under surface, halfway between the nacelle and the wing tip. The lights were stowed in a flush position and were electrically extended by switches actuated in the cockpit. Six hundred-watt lamps were installed that illuminated when extended past 10 degrees.

Wing Flaps

Two all-metal wing flaps were installed on each wing, one section inboard of the nacelle and another outboard. Attached to each flap section was an air deflector that operated as an integral part of the flap system. The air deflector was actually a second aerofoil section that fitted between the wing section and the larger main flap surface and was aerodynamically tuned to provide the most lift for a specific flap setting. At the time, the unique flap design became known as the Douglas-type slotted flap and was used because it provided both high lift and drag to assist in increasing the take-off and landing performance. The flaps were actuated by two hinge assemblies on the inboard sections and three on the outboard. The hinge assemblies were connected via torque shafts to an electric flap motor installed in the fuselage bomb-bay section. Limit switches installed in the wing cut the motor out when the flaps reached a full-down or full-up position. All four sections moved together and they were adjusted in unison to insure that each section

The A-26 utilized a two-piece flap assembly that worked in unison. The top section, between the lower flap and the aft wing, was often called an 'air deflector' as it made the main flaps more effective.
Boeing Historical Archives



deflected to the same degree. On later Invaders provisions were made for a mechanical extension or retraction of the flaps via a crank available in the gunner's compartment. The insertion of the crank into the mechanism automatically cut the circuit to the electrical flap motor to preclude the simultaneous operation of the mechanical and electrical system. Normally, the flaps were controlled by a switch in the cockpit and could be extended or retracted to any position along their travel. A flap-position indicator was also installed in the cockpit. The full down position provided 52 degrees of deflection; full-up position aligned the wing flaps with the contour of the upper wing surface.

Ailerons

A single fabric-covered aileron was installed on each wing spanning the outboard 11ft (3.4m) to the wing-tip section. Each aileron had a metal-covered servo tab that operated opposite to the direction of aileron travel to provide aerodynamic assistance to the control surface movement. The left-hand aileron servo tab could also be adjusted by pilot control to provide aileron trim. The ailerons were statically and aerodynamically balanced to provide the proper control forces and were conventionally operated via cables from the pilot's control wheel. Gap seals were installed over the openings between the wing surface and the ailerons to provide the best aerodynamic surface for the wings.

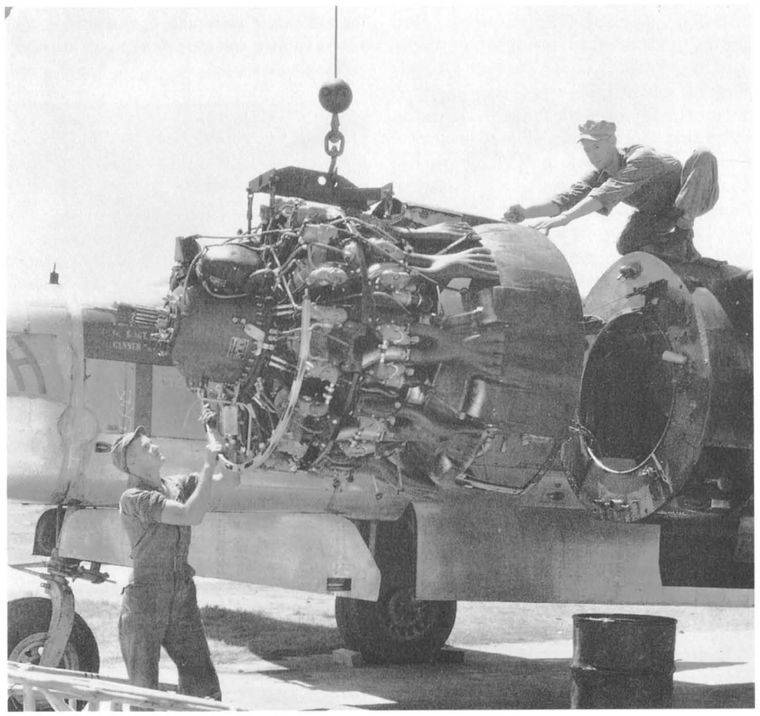
Nacelles

The nacelle sub-assemblies were one-piece, all-metal structures permanently attached to the wing spar structure with bolts and rivets. At the forward end of the nacelle was a stainless-steel firewall to which the engine mount was attached. The firewall had a large panel in the centre that could be removed from inside the nacelle to provide access to the engine accessories mounted on the aft end of the engine forward of the firewall. Aft of the firewall but forward of the front wing spar was located a 39gal (148ltr) self-sealing oil cell encased in an aluminium alloy shell. The cell consisted of three layers: an inner layer of oil-resistant synthetic rubber, a sealing layer and an outside covering. If the oil cell were punctured, the sealing material came in contact with the oil and swelled to several times its original size to seal the puncture. Usable oil capacity for the tank was 30gal (114ltr). A standpipe located within the oil tank provided a reserve oil supply of 1.25gal (5ltr) to supply the propeller-feathering pump in the event of the loss of engine oil.

Located between the two wing spars in each nacelle were the self-sealing, 300gal (1,140ltr) main fuel tanks. The filler access to each tank was located on the aft outboard corner of the tank and was covered by a wing access door. An electrically-driven fuel booster pump and fuel drain valve were located on the bottom of each tank.



Above: **The main landing gear of the A-26 showing the hydraulic lines leading to the brake and wheel assembly. The gear retracted aft into the nacelle.**
Boeing Historical Archives



The A-26 was designed to allow a common engine mounting between the left and the right engine. Douglas indicated that by using a quick-change engine kit, an engine could be changed by two men in two hours. As can be seen here, the firewall mountings were straightforward.
John Horne Collection

The nacelles also contained the main landing gear assemblies. The main landing gear structure was attached to the rear wing spar and the assembly was fully retractable into the aft part of the nacelle with doors covering the retracted gear. The main landing gears consisted of a wheel assembly, shock strut and hydraulically-actuated retraction mechanism. Early Invaders used Goodyear-built wheels and dual, multiple-disc brakes and had 47in (120cm), twelve-ply tyres. Later aircraft had a Bendix-built, low-pressure wheel and tyre assembly installed. In both cases, the brakes operated hydraulically but, in an emergency, air pressure could also be used to activate them. The landing gear doors were mechanically actuated by the movement of the main landing gear assembly.

Several removable panels and doors were built into the nacelle to provide access to various systems near the firewall. Large panels on each side of the nacelle just aft of the firewall provided access to the engine accessories. Two panels on top of the nacelle provided access to the carburettor and oil lines. A door on the underside of the nacelle forward of the landing gear doors covered the fuel drains and the electric fuel booster pump at the bottom of the main fuel tank. Another panel just aft of the cowl flaps on the right side of the nacelle at the midpoint provided access to the cowl flap electric motor.

Engines

All production A-26s were fitted with variations of the Pratt & Whitney R-2800 single-stage, two-speed, eighteen-cylinder Double Wasp radial engine. The A-26B and the A-26C were fitted with similar engines that each produced 2,000 horsepower at take-off settings. The two-speed blowers provided maximum power to 5,700ft (1,740m) in low blower and 13,000ft (4,000m) in high blower.

Much thought went into the engine installations by the Douglas engineers. Ease of maintenance was considered in the design of the engine mount to provide easy access to the engine and its accessories. The entire engine assembly, including cowling and cowl flaps, was interchangeable between the left and the right wing. It was possible to do a complete engine change using a quick-change kit in less than 2h.

The engine mount consisted of eight forged aluminium alloy ribs, stress-covered with stainless steel skin. An integral spun aluminium alloy ring attached to the ribs provided a mounting surface for the engine. The engine was bolted to the mount by using six Pratt & Whitney or Lord Co. rubber shock mounts. The engine mount was, in turn, attached to the nacelle with six engine mount bolt assemblies. The accessory section on the aft part of the engine extended through the engine mount ring with a fire seal separating the rear row of cylinders from the engine accessories. Large panels on each side of the nacelle could be removed to allow access to the aft end of the firewall. Then, a large panel on the stainless-steel firewall could be removed to provide direct access to the all the engine accessories mounted on the back of the engine. Normally the engine, cowl flaps and engine mount were removed from the aircraft as one assembly.

Intake air to the carburettor was provided from a ram scoop located on the top of the ring cowling. Air was ducted from the scoop initially through a metal section integral with the ring cowling. It then passed to an elbow-shaped casting with two flexible connectors to absorb engine vibration. Air then entered the down-draft carburettor located on the top rear of the engine. The elbow contained a door that allowed modulation of the air, heated by contact with the engine cylinders, to be blended as needed for carburettor heat. The doors were electrically controlled by switches in the cockpit and intake temperature gauges were provided on the instrument panel. Alternately, a door located on the forward end of the air scoop could be closed to force intake air through air filters (if installed) located on the inner edge of the ring cowl at the 10 and the 2 o'clock position. Filtered air would then be directed into the intake ducting aft of the ram air scoop.

A-26s were fitted with PT-13G1 Bendix-Stromberg, downdraft, injected carburettors. Later aircraft were equipped with updated carburettors with provision for water-injection. The engine exhausted to nine ejector-type stacks with two cylinders (a front-row cylinder and a corresponding rear-row cylinder) each ducting to a single exhaust stack.

Ring Cowling

The anti-drag ring cowling was a two-part assembly split into upper and lower cowl sections that were interchangeable between the right and the left engine. The cowl sections were held in place by two cowl ring supports, one located forward of the first row of the engine cylinders and the second aft of the rear row. The upper section of the cowl was held by two toggle bolts to the aft cowl ring support, forward of the carburettor air-duct elbow and by two fittings to the forward ring support. The lower section was attached to the upper section by eight latches operated by two latch nuts and locked by a latch lock screw. Thus it was a quick matter of releasing two latch mechanisms to detach the lower cowling and then several bolts to remove the upper section, exposing the entire engine for maintenance. The well-engineered engine cowling was one of the features that drew positive comments from the RAF when the A-26 was evaluated for British use in August 1944.

Cowl Flaps

Each engine assembly was equipped with eight overlapping cowl flaps to control the engine cylinder temperature. The cowl flaps were attached by hinges to the aft cowl ring support and operated by an electric drive motor. The motor, installed on the lower right side of the engine mount, drove each of the cowl flaps via a flexible shaft and a small gearbox. Each cowl flap operated over a range of 13 degrees, or extended approximately 5.5in (14cm) in the open position.

Propellers

Production A-26s were delivered with two full-feathering, constant-speed Hamilton Standard Hydromatic propellers equipped with the 23-E-50 hub and three 6359A-18 blades with a total diameter of 12ft 7in (3.8m). The propellers used regulated engine oil pressure to control propeller and engine rpm, utilizing a Hamilton Standard propeller governor mounted on the nose case of each engine. The rpm was

The Pratt & Whitney R-2800

The Pratt & Whitney R-2800 Double Wasp engine was the pivotal power plant for a large number of major American aircraft designs in World War II. Besides the A-26 Invader, the famous engine powered the P-47 Thunderbolt, the B-26 Marauder, the F6F Hellcat, the P-61 Black Widow and the F4U Corsair. Later, the engine was incorporated into the DC-6, the Convair 240 and the Martin 404, among others.

The company that designed and built the R-2800 had its roots in a machine company opened in 1860 at Hartford, Connecticut. The founders, Francis A. Pratt and Amos Whitney, gained a reputation for precision equipment and helped to develop the process of mass commercial production that predominated in the last quarter of the nineteenth century in the United States.

However, the roots of the 'Dependable Engine' company actually lay with the rival Wright Aeronautical Co. In 1924, the president of Wright, Frederick B. Retschler, had a parting of the ways with his directors over the path the company was taking and he ended by resigning. A number of key employees at Wright committed themselves to follow Retschler into a new aviation engine venture that sought, as its goal, to develop a new, air-cooled, 400 horsepower radial engine. The new engine would be lighter and more powerful than the surplus World War I, liquid-cooled engines then dominating the industry and would be attractive to military aircraft designers.

In 1925 Retschler went to the Pratt & Whitney Tool Company to try and interest the directors in forming a joint venture with him in the design and production of the new power plant. Pratt & Whitney agreed to the proposal, becoming half owner of the new Pratt & Whitney Aircraft Company on 14 July 1925. Retschler and George Mead, an ex-Wright engineer, owned the other half.

The first engine that the new company produced became the Pratt & Whitney R-1340 Wasp, which, in its first form, produced 425 horsepower and was put into production for a Navy contract. The Wasp was an air-cooled, nine-cylinder engine. Innovations in the new design included a split crankshaft, much improved cylinder machining for better cooling and engine accessory grouping for easier maintenance. The Wasp engine was a success, was eventually improved to produce 600 horsepower and remained in production until 1960. The first major derivative of the Wasp, the R-1690 Hornet, was not quite so successful, though it did power Boeing's Model 299, the forerunner of the B-17 Flying Fortress. Another derivative was the R-985 Wasp Jr, a popular engine subsequently installed on dozens of aircraft models.

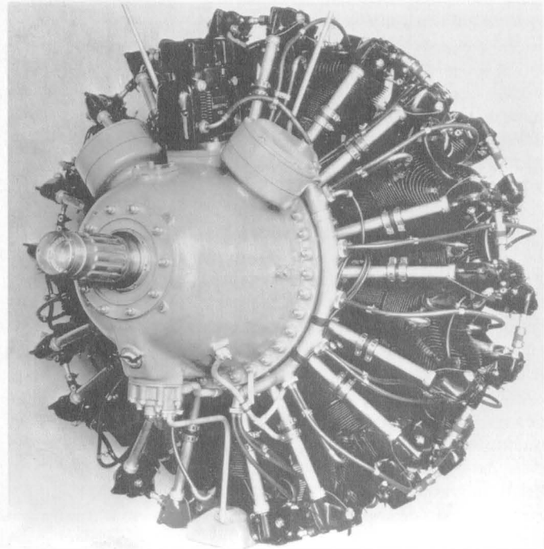
Beginning in 1929, Pratt & Whitney began the development of a series of engines utilizing two banks of seven cylinders each, a feature that substantially increased the power output without increasing the frontal area of the engine. This series developed into the R-1830 Twin Wasp and the R-1535 Twin Wasp Jr. The R-1830 was an extremely successful engine, powering the Consolidated B-24 and most versions of the Douglas DC-3, among other aircraft.

Pratt & Whitney and Wright Aeronautical both continued the development of larger twin-banked radial engines. Wright produced the R-2600 while Pratt & Whitney developed the eighteen-cylinder, Double Wasp R-2800. The design of the Double Wasp began in early 1937 and the first engine was test run in September that year. The first production engines were delivered to the US Army in 1939 and developed 1,850 horsepower at 2,600rpm. The first variation, or 'A' series, was selected to power the Martin B-26. Nearly 3,000 units were produced before the design was supplanted by the 'B' series, which powered the production A-26s and other aircraft types. Over 95,000 'B' series R-2800s were built. The last version, the 'C' series, was in development as the war ended. In all, approximately 125,400 R-2800s were produced before production was halted in 1960.

The R-2800 engine was an eighteen-cylinder, twin-row, air-cooled, gear-driven, supercharged radial engine. It displaced 2,804cu in (46,000cu cm) and the version installed in the A-26 produced 2,000 horsepower at take-off power. The crankcase was of three-piece, forged aluminium alloy construction. The cylinders were steel barrels with cast aluminium alloy heads. The aluminium heads had their thin cooling fins precisely machined by automated equipment to meet exact tolerances. The three-piece counterbalanced crankshaft was supported by three plain bearings. A gear case at the front of the engine provided a speed reduction of .50:1 or 0.56:1, depending upon the version.

Both the prototype and the production A-26s were delivered with the R-2800-27 (built by Pratt & Whitney) or the identical R-2800-71 (built by Ford), both 'B' series engines. The 'B' series had a two-speed, two-stage, gear-driven supercharger with an intercooler. The engine was equipped with either the Bendix Stromberg PT-13D6 three-barrel downdraft carburettor, or the PT-13G6 downdraft carburettor that incorporated water injection. Specifications for the engine stated that the engine starter was 'optional', but one would suspect that the option really lay in whether or not the engine was to be started. In any event, the A-26 was equipped with a direct or inertia starter, with a manual crank available to wind up the inertia component in the event of a electrical starter failure. The dry weight of the engine was 2,480lb (1,126kg), thus offering 1.24lb per horsepower.

The major change offered in the A-26D and the A-26E was their equipping with the Chevrolet-built R-2800-83, a 'C' series engine. This engine offered 2,100 horsepower at take-off power and normal power of 1,875 horsepower. The version to be installed on the A-26D and the A-26E was built with a single-stage, single-speed, gear-driven supercharger.



Design work on the R-2800 was begun by Pratt & Whitney in 1937. The engine was one of the workhorse powerplants of the war, installed on the Martin B-26 and the Republic P-47, besides the A-26. The engine as typically installed on the A-26 produced 2,000 horsepower at take-off power. Over 125,000 R-2800s were built between 1937 and 1960. National Archives

maintained by the governor adjusting the pitch of each propeller blade and could be set by the pilot with the propeller control to maintain any constant speed range between 1,200 and 2,700rpm.

Propeller feathering, which directed the propeller blades to a 90-degree pitch to prevent in-flight windmilling with an inoperative engine, was provided by a separate electric high-pressure oil pump located beneath the oil tank in each nacelle. When the pilot depressed the feathering switch in the cockpit, the pump provided high-pressure oil to the dome in the propeller hub, bypassing the propeller governor and driving the blades to the feathered position. The propeller could be unfeathered by the same pump. The feathering system was not dependent on engine oil pressure and a reserve of oil for the system was provided by a standpipe built into the oil tank cell.

Wing Tips

The wing tip assemblies were built of either moulded plywood or dural aluminium alloy. Each tip was attached to the spar end cap with four bolts. A position light assembly was installed on the forward corner of the wing tip and fitted with a Plexiglas cover.

Electrical System

The A-26 electrical system was powered by two 200A, engine-driven DC generators regulated to 28.5V. The generators were bolted to the generator pads on the engine accessory case at the rear of the engine. The generators provided the source for all of the aircraft's electrical systems and charged the two 24V batteries installed in the engine nacelles. Operated by switches on the overhead electrical panel in the cockpit, each generator had a corresponding voltage regulator installed together on the floor of the cockpit next to the right-hand outboard wall.

The electrical installation was a single-wire, ground-return system. A main electrical bus bar extended through the fuselage and into the wing sections from which most of the electrical equipment was powered. This main bus bar was constructed of five sections of aluminium covered with flexible insulating tubing. The bus extended from the left side of the cockpit back to the gunner's compartment and through the inboard wing leading edges to each engine nacelle.

There were several junction boxes installed throughout the airframe, including a forward fuselage box installed ahead of the instrument panel, a gunner's relay junction box and turret control box in the gunner's compartment, and firewall junction boxes in the nacelles. The junction boxes contained relays, circuit breakers, terminal strips and grounding studs.

An external power receptacle was installed on the outer surface of the left engine nacelle. This provision allowed a ground power unit or battery cart to be used for external powering of electrical systems and for engine starts. On some aircraft the receptacle was covered by a small hinged door. A battery disconnect switch was also installed at the position to connect the external power source to the aircraft's electrical system. Operating procedures required that the main aircraft batteries be turned off before connecting an external power source to the aircraft's systems.

There were few systems on the A-26 that required AC power. The remote magnetic compass indicator had a small inverter that produced 6V installed in the gunner's compartment. The MN-26Y radio compass equipment had a self-contained AC inverter that supplied 750V. The turret system, as noted earlier, used DC current to power a dynamotor that provided 115V. Those A-26Cs equipped with radar units had special AC inverters installed that were dedicated to the radar. These aircraft had two inverters, one in the fuselage aft compartment and the other in the nose compartment. Associated AC distribution was routed through a junction box installed in the gunner's compartment that, for radar-equipped A-26Cs, became the radar operator's compartment.

Hydraulic System

The A-26 hydraulic system operated the landing gear, brakes, bomb bay doors and bomb bay spoilers. The system contained 8gal (30ltr) of hydraulic fluid. One gear-driven, hydraulic pump was installed on each engine to provide source pressure of from 850 to 1,000lb/sq in (4,150 to 4,890kg/sq m) for the system. Fluid was supplied under pressure through check valves and a filter to a hydraulic pressure regulator. The regulator was installed in the aft end of the pilot's compartment and maintained system pressure by bypassing fluid from the system back direct to the hydraulic reservoir. Normally, fluid under pressure flowed from the regulator to aircraft systems or to the hydraulic pressure accumulator, which was installed in the rear cockpit just forward of the bomb bay bulkhead and beneath the pressure regulator. It was a spherically-shaped tank with a rubber bladder installed within it. One side of the bladder was charged with 600 to 750lb/sq in (2,930 to 3,660kg/sq m) of air pressure. The other side of the bladder provided a hydraulic reservoir. The combination of air and hydraulic pressure in the tank served as a 'shock absorber' for system demands and provided a constant source of system pressure. A hydraulic pressure gauge in the cockpit provided the pilot with a system indication. The hydraulic reservoir, with a capacity of 1.75gal (6.6ltr) was also installed in the aft end of the pilot's compartment.

On some airframes electrical solenoid valves were installed in the supply lines going to the hydraulic pumps on the engines. In the event of fire, the supply of fluid feeding toward the engines could be shut off. The valves were controlled by switches in the cockpit; the same switches also controlled oil cut-off valves for the same purpose.

An emergency hydraulic system was installed as a back-up. Pressure for this was provided by a hand pump installed on the right side of the pilot's pedestal. Fluid was supplied from an emergency reservoir located below the main fluid reservoir. The pilot could select a hydraulic system function (such as lowering the landing gear), then select the emergency pressure valve and supply system pressure by actuating the pump manually. This method could be used to open or close the bomb bay doors and spoilers or to extend the landing gear.

The wheel brakes were provided with a brake emergency air system. A steel air bottle, installed aft of the emergency fluid reservoir, was charged to 575lb/sq in (2,800kg/sq m). In the event of a main hydraulic failure, the pilot could actuate the brake air-control valve, installed near the landing gear selector switch on the instrument panel, to apply air pressure to the wheel brakes. The air pressure was routed from the air cylinder through the hydraulic lines leading to the brakes. The switch had three positions: 'neutral', 'on' and 'release'.

Fuel System

The standard fuel system consisted of five self-sealing fuel cells, engine-driven fuel pumps installed on each engine, electrically-operated fuel boost pumps installed at each fuel tank, fuel-level transmitters installed in each tank, fuel gauges installed in the pilot's compartment and various fuel lines, valves, strainers and drains installed throughout the system. Fuel requirements specified the use of 100/130-octane aviation fuel.

A main fuel cell with a capacity of 300gal (1,135ltr) was installed in each engine nacelle. Inboard of the nacelle

and installed in the wings were auxiliary fuel tanks with a capacity of 100gal (380ltr) each. Installed in the upper, forward bomb bay was an additional tank with a capacity of 125gal (473ltr). Thus the standard A-26 had a normal maximum fuel capacity of 925gal (3,500ltr).

Provisions were made for the installation of additional tanks. A 675gal (2,555ltr) ferry tank, contoured to the interior dimensions of the bomb bay, could be installed on the bomb shackles. In some cases the lower turret aft of the gunner's compartment was removed and replaced by an additional 125gal (473ltr) auxiliary fuel tank. This tank was virtually identical to that installed in the upper bomb bay. As noted elsewhere, some later A-26s had provisions to carry droppable fuel tanks from hard points on the under surface of the wings just outboard of the engine nacelles. These had a capacity of 165gal (625ltr), but were limited to 155gal (587ltr) because of the angle of installation on the wing.

Each tank was equipped with an electrically-operated, fuel boost pump. Normally, each main and wing auxiliary tank fed its own engine. Droppable wing tanks, if installed, had their fuel pumped into the main nacelle tank. The aft fuselage tank, if installed, had its fuel

Flying the A-26

Both the A-26B and the A-26C operated under the same limitations. Aerobatic flight such as loops, spins, rolls or inverted operations were prohibited, though probably attempted on occasion. The aeroplane had no level flight airspeed restriction. Maximum landing gear extension speed was 160mph (258km/h), while the flaps could be extended at a speed of 208mph (335km/h). At a maximum gross weight of 35,000lb (15,900kg), the aeroplane stalled wings level at 141mph (227km/h) with zero flaps and at 116mph (187km/h) with flaps fully extended. At a lighter weight of 27,000lb (12,260kg) the speeds were 124 and 101mph (200 and 163km/h), respectively. The aeroplane could be dived as long as the indicated airspeed did not exceed 425mph (684km/h) at a weight of 26,000lb (11,800kg), or 350mph (564km/h) at 36,500lb (16,570kg). Bomb bay doors could be opened at the maximum diving speed of 425mph. Performance charts provided information up to a overload gross weight of 38,000lb (17,250kg), though the aircraft was limited to maximum gross take-off weight of 35,000lb. The designed maximum gross weight was 26,700lb (12,120kg). The significantly higher gross weights were allowed because much of the weight was in ordinance that could be instantly salvoed in the event of an engine failure, enabling a rapid weight reduction of up to 6,000lb (2,725kg).

Before starting the Pratt & Whitney R-2800 engines, it was necessary to pull the propellers manually through twelve blades to ensure that no hydraulic lock existed in any of the lower cylinders. Once ready for starting, the engines mixture controls were set at 'idle cut-off' and the propellers at 'increase rpm'. The supercharger controls were set at 'low' and the throttle was opened one-quarter for the engine being started. The ignition switches were 'off'. Normally the right engine was started first to allow a check of the right hydraulic pump to be made before the left engine was started. The starter was energized and allowed to accelerate for 20sec, at which point the starter was engaged to the engine while still being energized. After the propeller had made one full revolution, the ignition was switched to 'both' and the fuel booster pump to 'low boost'. The engine primer was then held 'on' as the engine began to fire. As the engine came up to speed the mixture was moved to 'auto-rich' as the primer was released. The oil-pressure and other gauges were checked.

After both engines were started and warmed to the operating temperature (at least 40°C for oil), the ignition switches were momentarily switched to off to check that the cylinders had stopped firing, thus ensuring that the magnetos were properly grounded. Generator and battery checks were then accomplished. The propeller governors were exercised by running the engines at 1,600rpm at 'increase rpm' and then by moving the propeller controls to 'decrease rpm' and back several times. Then the carburettors were checked by running the engines at 1,700rpm and moving the mixture controls from 'auto rich' to 'auto lean' and observing the engine rpm for changes. A range of from +25 to -75rpm was the maximum change allowed. The superchargers where then checked by setting the engine speed at 1,700rpm with the throttles, shifting the superchargers to 'high' blower and then running the engine manifold pressure to 30in (76cm) with the throttles. At that point, the superchargers were switched back to 'low' blower and the manifold pressure drop noted.

After the superchargers had been checked, the throttles were run up to 30in of manifold pressure. It was necessary to run up both engines simultaneously to avoid damaging the nose wheel assembly. At 30in the 'left', 'both', 'right', 'both' positions were selected on the ignition switches to ensure that each engine magneto was firing the spark plugs properly. After the run-up, the engines were accelerated to no more than 2,100rpm in both 'auto rich' and 'auto lean' to check for smoothness. Then the throttles were set at idle to check that the engines idled properly at 700rpm. The engine checks were then complete.

As the A-26 had no steerable nose wheel, all directional control on the ground was accomplished with differential braking, power and whatever rudder effect could be gained. The aeroplane taxied better at a faster pace.

At the runway final checks were accomplished, including fuel tank selections, fuel pumps, cowl flaps set to half open and the bomb bay doors and canopy were closed. Wing flaps were recommended between 15 and 20 degrees. Trim was centred for aileron, rudder and elevator. Flying instruments were double-checked.

Once lined up on the runway, the throttles were increased to achieve 30in of manifold pressure so that engine gauges could be checked before the brakes were released. After release, the throttles were opened to set take-off power, limited to 52in (132cm) of manifold pressure at sea level. Depending on the flap setting, the nose was slightly rotated at approximately 100mph (160km/h) and the aircraft allowed to fly off the ground. As in any multi-engined aeroplane, the flight time spent between rotation and the minimum controllable airspeed for single-engined flight was critical. That was specified as 140mph (225km/h) for an A-26 weighing less than 32,000lb (14,530kg) and 160mph (260km/h) for heavier aeroplanes. If an engine failed below that speed, both throttles were to be closed and the aeroplane landed straight ahead, come what may. The A-26 was not controllable and would roll into the failed engine if the good one were left at full power. Above 140 or 160mph the aeroplane was controllable with one engine operating and the other windmilling. Gear retraction was also critical, so the landing gear was selected 'up' as soon as climb was established, either single- or twin-engined. Flaps were then retracted. If the A-26 was operating single-engine, the handbook specified that the aircraft could climb to over 14,000ft (430m) if operating at a weight of 27,600lb (12,530kg). At 34,000lb (15,440kg), though, the single-engine ceiling was 2,000ft (610m) while climbing at 170mph (274km/h). In the event of an engine failure, bombs could be salvoed, the handbook suggesting that the bombs be unarmed and in the safe mode before being dropped.

The aeroplane gained height in 'auto rich'. Cylinder head temperatures were to be maintained below 260°C with the cowl flaps and the oil temperature limitation was 100°. The handbook notes that the aeroplane is stable, with directional stability increasing with the bomb bay doors open. The superchargers were shifted from 'low' blower to 'high' blower at approximately 6,700ft (2,040m).

For approach and landing, the airport traffic pattern was flown with flaps at one-quarter (20 degrees) at about 150mph (240km/h), with gear extension accomplished below 160mph (260km/h). The propellers were set to 'increase rpm', the fuel-boost pumps turned on, mixture set to 'auto rich' and the cowl flaps closed. Flaps were set to 'down' and the final approach flown at 120mph (190km/h) for an aircraft weight of 27,000lb (12,260kg). The approach was flown power-on and touch-down in a slightly nose-high attitude. Normal braking was carried out after the nose wheel had lowered to the ground.

After landing, the cowl flaps were opened, the wing flaps raised and the fuel-boost pumps turned off. Once back at the ramp, the engines were idled at 1,000rpm to stabilize cylinder head temperatures below 205°C. The right engine was normally shut down first to allow the hydraulic system of the left one to be checked, usually by operating the bomb bay doors. The engines were shut down by moving the mixture control to 'idle cut-off'. Once the engines had died, the ignition and battery switches were turned off.

pumped into the upper bomb bay tank. The upper bomb-bay tank fed the ferry tank, if installed, or fed to the bomb bay and cross-feed fuel selector valve for routing to a particular engine or to both. If the ferry tank were installed, fuel from it was routed direct to the fuel selector valve.

Two rotary-type fuel selector valves were installed on the centre pedestal in the cockpit. Each valve selected 'main on', 'aux on' or 'both off'. The main and the wing auxiliary booster pump switch were wired into the valve and were powered when selected as a fuel source. The fuselage tanks and droppable tank booster pumps were controlled separately.

Fuel supplied by the several tanks was routed to each engine through a fuel strainer to the engine-driven fuel pump. The pumps were designed to deliver fuel at a constant pressure, either 17lb/sq in (83kg/sq m) (at 2,000rpm) for early carburettors, or 23lb/sq in (112kg/sq m) (at 30in [76cm] of manifold pressure) for later installations. The fuel pump bypassed excess fuel back to the intake side of the pump. There was also a bypass feature to allow the fuel boost pumps at the fuel tanks to supply pressure to the carburettor in the event of an engine-driven, fuel pump failure.

The pilot had fuel gauges to indicate the levels in the tanks. Fuel-pressure indicators, indicating the pressure at the carburettors, were also installed in the cockpit. Provisions were made for oil dilution with fuel for cold-weather engine starts and engine pre-start priming. Both functions used fuel boost pump pressure and a solenoid-operated valve to direct fuel pressure to the oil dilution system or to the fuel-priming spider leading to the engine cylinders. These switches were installed on the overhead electrical panel in the cockpit.

Oil System

Two independent engine oil systems were installed. Each nacelle contained a 39gal (148ltr) tank with a normal capacity of 30gal (114ltr). Oil was gravity-fed from the tank to the engine-driven oil pressure pump mounted on the rear of the engine. The pump boosted oil pressure to approximately 75lb/sq in (366kg/sq m), forcing the oil through the engine for lubrication and cooling. Oil exiting the engine was carried by two scavenge pumps through an oil-temperature regulator and then back into the oil tank. The regulator assembly included a cooler installed in a radiator assembly just outboard of the engine nacelle. It was supplied with ram air from an intake on the leading edge of the wing. Temperature was controlled by an exit door for the airflow installed on the wing under surface. The normal inlet oil temperature range was between 140 and 153°F (60–75°C). The oil system also provided a source for the propeller-feathering pump.

Oxygen System

On some modified A-26s a low-pressure, diluter-demand oxygen system was installed to supply a capacity of three man-hours per crew member at 15,000ft (4,600m). For aircraft equipped with an all-purpose gun nose, the oxygen equipment consisted of three Type F-2 bottles installed in the top of the aft fuselage section; two Type D-2 bottles located in the aft gunner's compartment on the sighting station armour plate; three oxygen-system flow indicators, three system pressure gauges, three diluter-demand regulators, connecting lines, check valves and an oxygen filler port. For modified A-26Cs with the bombardier nose, two additional Type D-2 bottles were installed in the aft bomb bay with additional lines, a regulator and pressure gauge for the bombardier's position. All bottles were pressurized to approximately 425lb/sq in (2,070kg/sq m) of oxygen.

Heating and Ventilating System

The typical A-26 had two separate heating and ventilating systems installed: one for the forward section and one for the gunner's compartment. Both utilized two Stewart Warner 40,000Btu heaters that used a fuel–air mixture drawn from the high-pressure side of an engine supercharger blower. The mixture was ducted through a firewall shut-off valve and flame arrestor to a burner. There, the mixture is ignited in a burner tube. Exhaust from the burner was fed back to the low-pressure side of the engine supercharger blower. The igniter was electrical and operated through a thermostatic blade in the igniter. When the temperature rose above a preset level, the igniter turned off; when it dropped below it the igniter would resume operation.

One of the two system heaters was used to warm cold air drawn from outside the airframe. The second heater was used to warm recirculated air inside the cabin. The forward and aft system provided warmed air through ducting to the crew positions. On some aircraft the heaters were not installed. These may have been earmarked for the south-west Pacific although the record is not clear. On a few later aircraft a completely different heating system was installed. These had two 100,000Btu surface combustion heaters installed, one for the forward fuselage and another for the aft. For these installations fuel was available from the right main wing tank for ground operation of the forward combustion heater only; in flight, both heaters were supplied with fuel drawn from the carburettor fuel line for the right engine and fed to the heaters at 16lb/sq in (78kg/sq m). Warm air was then circulated through ducting systems to the crew positions.

De-ice and Anti-ice Systems

The A-26 could be equipped with de-icing boots on the outboard leading edges of the wings, the leading edge of the vertical stabilizer and the leading edges of the horizontal stabilizers. These boots worked on pulsating air pressure supplied through three tubes running through the boots. The expansion of the tubes caused any ice on the surfaces to break away. De-ice boots were supplied with pressure from engine-driven vacuum pumps. When the system was turned off, vacuum pressure held the boots flush against the aerofoil surfaces. When operating, air from the pump pressure side was fed through a regulator to reduce the pressure to 9lb/sq in (44kg/sq m). It was then fed through an electrically-operated Snap Action De-icer Distribution Valve that mechanically switched from pressurizing the boots to vacuum pressure on them to alternately expand and contract the tubes in the boots through an electrically-timed sequence.

The anti-icing system prevented ice build-up on the propellers, the Pitot-tubes, the gun sighting stations in the gunner's compartment and the carburettor. The propellers and the gun sighting station were anti-iced with a solution of isopropyl alcohol. The propeller anti-ice system consisted of a 6gal (23ltr) tank installed in the aft end of the right nacelle, an

electrically-operated, anti-ice pump, lines and valves and a propeller-slinger ring for distribution of the anti-icing fluid over the propeller blades. The sighting station anti-ice used a 1gal (4ltr) tank installed in the left-hand side of the aft fuselage. This system used a hand pump operated by the gunner and a valve to direct fluid to either the upper or the lower periscope sighting station.

On early aircraft the Pitot-static tube was installed on the upper vertical stabilizer and was heated by electrical elements installed on the forward and the rear of the tube and supplied through a 10A circuit wired to a switch in the cockpit. On later aircraft, the Pitot tube was moved to the nose section with static ports installed nearby and both were heated.

Engine-Fire Extinguishers

On later A-26s an engine-fire detection and extinguishing system was installed. The detection system consisted of fusible alloy fire detectors on each engine firewall. In the event of a fire, the fusible detector was designed to melt and close a circuit with a core wire in the assembly. The closed circuit would illuminate a red warning light in the cockpit. The fire extinguishing system consisted of three 5lb (2.3kg) carbon dioxide cylinders installed in the left nacelle above the main landing gear doors. These tanks were connected to two-way valves to direct the gas to either engine system, where it was ducted to perforated tubing outlets in each nacelle aft of the firewall. In the event of an engine fire, the engine would be shut down and the propeller feathered. Through shut-off valves, the oil, hydraulic and fuel system sources were removed at the engine and any fire in the power plant should thereby have been extinguish. Any fire persisting aft of the firewall might then be controlled by using the carbon dioxide system.

Photography System

The A-26 was equipped for several types of photography. Electrically-operated reconnaissance cameras, either the American K-24 or the British F-24 orientation camera, could be installed in a mount provided in the aft fuselage section for photography through a camera port. The cameras could be set up to operate by using the bomb-release toggle on the pilot's control wheel with an intervalometer to set the timing between exposures.

The gunner in the aft compartment was provided with small camera doors installed on each side of the lower fuselage near the floor. On later aircraft the right-hand camera port was incorporated into the gunner's emergency escape hatch; on the left side the camera port was converted into an observation window. A circular opening in the aft right-hand bomb-bay door was removable and allowed access from the gunner's compartment for a manually-operated camera to be positioned vertically. Each of the gun turrets was equipped with an N-4 gun-sight aiming point camera that operated together with the gun triggers to record results on 16mm film. The multipurpose nose had provision for the installation of another N-4 gun sight for use with nose cannon, nose guns or wing guns. Alternatively, N-1 or N-6 gun-sight aiming point cameras may have been installed.

Avionics and Radios

The following radios were normally installed on production A-26s: for communications, the SCR-274-N command radio set with three transmitters and three receivers was utilized. Three transmitters, BC-457-A, BC-458-A and BC-696-A, were installed in a rack on the left-hand side of the cockpit behind the pilot's seat. They provided transmitting capability between 3.0 and 5.3Mc/s (MHz) in the high frequency (HF) range. The transmitters were remotely tuned by using a BC-451 radio control box installed on the left-hand side of the pilot's compartment. The three receivers, BC-454-A, BC-453-A and BC-455-A, were mounted on a rack just below the transmitters. They provided receiver capability in the range 190 to 550kc/s (kHz) and 3.0 to 9.1Mc/s in the low and medium frequency (L/MF) ranges. The receivers were remotely tuned by using a BC-450-A radio control box installed to the left of the pilot's seat. The transmitters and receivers utilized an antenna extending from a mast installed just aft of the cockpit to the tip of the left-hand horizontal stabilizer.

Also available for communications was an SCR-522 unit that operated on four preset channels in the 100–156Mc/s very high frequency (VHF) band. The transmitter and the receiver, both remotely controlled, were installed in the aft part of the pilot's compartment. Remote control of the transmitters and receivers was by way of a BC-602-A remote-control box with four buttons for channel selection. The box was installed on the top of the pilot's control pedestal just aft of the instrument panel. The antenna for the VHF unit was the AN-104-A blade antenna mounted on top of the fuselage above the radio installation.

For navigation, a MN-26Y radio compass was installed on some aircraft. The MN-26Y receiver was installed on the right-hand side of the aft fuselage compartment and provided capability in three L/MF frequency bands: 150–325kc/s, 325–695kc/s and 3.4–7.0Mc/s. The receiver was remotely controlled from the cockpit using a MN-28 Y remote control unit that provided tuning and antenna selections. The azimuth control of the MN-20A loop antenna, installed above the receiver on the aft fuselage, was controlled by a MN-52 azimuth-control unit connected with a flexible tuning shaft. The non-directive sensing antenna extended from an insulator mounted on the aft fuselage to the tip of the vertical stabilizer. The MN-26Y receiver navigational presentation was made to the pilot with a type IN-4A Left–Right Indicator mounted on the instrument panel. On later aircraft the MN-26Y was replaced by an AN/ARN-7 receiver.

Some aircraft had the RC-193 marker-beacon receiver installed to provide additional positioning capability for navigational and landing aid. The beacon receiver was mounted on a shelf in the aft fuselage compartment and utilized a 10ft (3m) antenna strung between two masts on the lower aft fuselage. An amber light read-out was provided for the pilot on the main electrical control panel to indicate beacon passage in flight.

Also in the standard installation was an SCR-595-A or SCR-695-A Identification Friend or Foe (IFF) transponder equipped with destructor circuits to prevent the classified equipment from falling into enemy hands. Some aircraft were either factory wired or later modified to carry a variety of radio units. These included the AN/APQ-9 VHF barrage transmitter, the AN/APQ-13A bombing and navigation radar unit installed in the gunner's compartment, a medium-range HF AN/ARC-8 transmitter/receiver for distance communications and the AP/APN-9 LORAN receiver.

CHAPTER FIVE

The A-26 in World War II

Unhappy Debut

The introduction of the Douglas A-26 to combat operations was not successful. As noted earlier, aircraft numbers 16 to 19 off the Long Beach production line were earmarked for a combat demonstration with the Fifth Air Force operating in the south-west Pacific. Through June and July 1944, the four A-26Bs were assigned to the 3rd Bomb Group (BG) for combat trials. The 3rd BG was operating A-20s and B-25s in combat from a base at Nadzab, New Guinea, when the trials were conducted. During the span of two months, three A-26Bs were flown in combat for approximately 50h each and the fourth for nearly 25h. Ten pilots and gunners flew the aircraft on combat missions. The summary report sent to the AAF Materiel Command (AMC) indicated that the combat crews were not impressed. Not unexpectedly, visibility was considered unsatisfactory for combat. The report noted that:

> ... this one feature, lack of visibility, in the opinion of all pilots makes the A-26B absolutely unsatisfactory as an attack airplane. Inability to see to either side sufficiently makes it impossible to fly the tactical formations that are mandatory in low-level tactics. This condition is so critical that personnel flying in combat consider it dangerous when flown in the accustomed attack manner.[91]

The under-wing gun packages, providing eight forward-firing .50 calibre guns, also drew comments. The pilots were all impressed with the firepower – when combined with the six-gun nose, but the drag from the guns under the wings reduced the top speed by 25mph (40km/h), thus eliminating any advantage the A-26 had over the B-25. Without the wing guns, the forward firepower of the six .50 guns was considered inadequate. The report indicates that the crews had both 75mm and 37mm cannon available for testing. However, it was stated that 'no interest whatsoever was shown in the 75mm cannon in the all purpose nose and it is not desired. There was interest, however, in the 37mm gun configuration, but it was impossible to conduct any tests in combat due to the fact that no links were available.'[92]

In addition, the Invader's fuel capacity was considered insufficient and the lower turret unnecessary. However, positive comments were made about the maintainability of the aircraft, calling it 'very satisfactory' with some minor recommendations about the electrical system. Overall, the report showed the A-26 as unsuitable for combat.[93]

The commander of the 3rd BG was Col John Henebry. He recalled in 1997 that the A-26s were shipped disassembled to the combat zone, offloaded and reassembled at Finschhafen, New Guinea, which served as an American air depot. The airplanes were flown to the group's base at Nadzab in late May 1944. Within a week, the Douglas production test pilot William Morrisey had introduced Henebry and several other pilots to the Invaders. As the Allied ground forces were making rapid advances in New Guinea, the A-26s were moved forward to a base at Hollandia for the combat trials.[94]

Henebry was at first impressed by the Invader. It had good range, a good bomb load and good engines, but as the aircraft were tested in combat he and other pilots identified some major shortcomings. Henbry led several short-range search and destroy missions, and then a strike at Manokwari, 375miles (604km) north-west of Hollandia on the Vogelkop Peninsula. Over the span of a month, targets at Numfoor, Biak Island and Wakde Island were attacked. Through the month the general reaction of the pilots and gunners to the aeroplane was negative. Pilots felt that the cockpit arrangement was poorly designed. For those used to the A-20, the A-26 cockpit was too wide for a single-pilot machine and, with the single pilot position on the left side of the cockpit, visibility to the right was poor. Visibility to the left was the same, blocked by the large engine cowling and nacelle. The heavy framing of the canopy further restricted vision. The bomb bay doors were activated by a lever located forward and to the right of the pilot's seat, forcing him to bend down and forward to reach it.

The general conclusion of the group's experience with the A-26 was that it was not suitable for combat. Henebry noted that the A-26 was a good aircraft but not suited for the tactics being employed – low-level strafing and bombing with tight formations over scattered targets especially against Japanese shipping.[95] Thirty-two specific changes were recommended to make the aeroplane suitable for combat.

Henebry's criticisms wound their way through Fifth Bomber Command and caught the attention of its commander Gen George Kenney, who lent a sympathetic ear. Though Kenney had been an early supporter of the A-26, he felt that the war had outpaced the aircraft and that it was no longer needed. Henebry noted that Kenney felt that the A-26 'was poorly designed and certainly not advanced enough for the post-war inventory he envisioned.'[96] Kenney was content to fight the rest of the war with his A-20s and B-25s.

Kenney decided to send Henebry to Washington, DC to report personally on the shortcomings of the aeroplane. Henebry thus went to present his findings to several groups of AAF leaders, eventually reporting to Gen Arnold himself. Henebry recalled that Arnold was 'very concerned and disappointed with our experiences with the plane, and that he was looking for some way to overcome the A-26's shortcomings.'[97]

Despite the poor showing of the aircraft in the Pacific, the AAF leaders retained confidence in the basic suitability of the A-26. Certainly

visibility was a problem for the pilot, one that had been identified two years earlier and yet remained uncorrected. The aeroplane was designed to be wide enough to allow the installation of the 75mm cannon and a gunner in the cockpit, necessitating a left-hand position for the pilot and allowing the aircraft to be used as a medium-altitude bomber. Performance, especially without the drag-causing under-wing gun pods, was significantly better than that of the B-25, the B-26 and the A-20 in every aspect. Plans to deploy the A-26 quickly to the European Theater of Operations (ETO) were not delayed nor deterred by the unfavourable reports from the Fifth Air Force. Specific criticisms were addressed by the Wright Field engineers and passed to Douglas, but the production lines continued to gain momentum and a large percentage of the output was combat-bound.

Aside from the four A-26s sent to the Pacific, most of the first twenty Invaders built at Long Beach were earmarked for further developmental testing. Many were flown either to Wright Field or to the Proving Ground at Eglin Field, Florida. The subsequent sixty production deliveries from Long Beach were mostly sent to training units at either Barksdale AAF or Lake Charles AAF, both in Louisiana, where initial air crew training was undertaken.

Service in Europe

Beginning with aircraft number 84 (s/n 41-39183), a steady stream of A-26s were sent direct to the Ninth Air Force depots in England as replacement aircraft for Douglas A-20s and Martin B-26s in existing Ninth Air Force bomb groups. Almost all of the production output between July and November 1944, consisting of approximately 200 aircraft from Long Beach and 120 from Tulsa, was flown direct from the factory to Ninth Air Force depots by Air Transport Command ferrying crews.

At Barksdale AAF training was conducted for the first squadron to be formed around the A-26. The intent was to get the A-26 into service as quickly as possible, and it was felt that the most efficient way of doing this was to train a squadron of crews at Barksdale, provide them with new A-26s off the production line and fly them en masse to England and assign them to a bomb group for suitability trials. This training was accomplished at Barksdale in June and July 1944 using nine A-26s from early production at Long Beach.[98]

Twelve A-26Bs and six A-26Cs left the USA in late July and early August for assignment to the Ninth Air Force for a European combat demonstration. As a unit, they were attached to the 386th BG (Medium) equipped with Martin B-26 Marauders and operating from Great Dunmow in Essex, England. Their arrival in early August was notable (see sidebar) and they subsequently became part of the 553rd Bombardment Squadron (BS).

The 386th BG was originally formed on 25 November 1942. After training at Lake Charles AAF, Louisiana, the unit was assigned to the Eighth Air Force in June 1943, flying its first combat mission with B-26s in July from a base at Snetterton Heath. With the establishment of the Ninth Air Force in August 1943, the 386th BG was transferred to the new tactical air force and the unit moved to Great Dunmow in September. Four bomb squadrons, the 552nd, the 553rd, the 554th and the 555th, made up the 386th BG. During the combat trials, the unit was commanded by Lt Col Thomas G. Corbin.

In Europe the first A-26 combat mission was flown on 6 September 1944 against targets near Brest. The mission was logged as Number 269 by the 386th Bomb Group. In the subsequent two weeks, an additional seven missions were conducted from Great Dunmow. Though not revealed by the record, it would appear that the combat trials were curtailed by the movement of the group from Great Dunmow to the French airfield at Beaumont-sur-Oise during the last two weeks of September. Before the group moved, the A-26s were flown to an air depot for further assignment.

The First A-26s Arrive in England

The arrival of the first A-26s in England in early August 1944 was a less-than-auspicious event. Lt Col Ted Hankey, a 386th Bomb Group leader, provided his recollection in *The Crusaders*, a unit history published by the 386th Bomb Group Association.

I was scheduled to go home in August 1944. Sometime around the first of that month Gen Anderson called me in and told me that there was a new airplane on the way, the A-26, and that it would be assigned to the 386th. He asked me to take charge of the unit, which had been trained as a squadron at Barksdale, lead them on the first five missions, and then I could go home.

The squadron was preceded by a colonel who had trained the unit. He was convinced that the A-26 would win the war single-handedly. He told us how it could bomb at medium altitude and strafe. None of us with combat experience in the Marauder believed it and some very heated arguments ensued, almost ending in a fist fight when the colonel squared off against Capt Al Hill, one of our lead bombardiers.

The day arrived when we got a call from Prestwick, Scotland, that the squadron was leaving there for Great Dunmow. I gave them a few hours and headed over to the tower with their commander to welcome them to the 386th. It was a typical English day with scud blowing across the field around 1,500ft [460m] and two layers of overcast above that. It had been raining and the runway was slippery and the Essex mud alongside even worse.

From the tower we began to pick up their chatter, the essence being: 'Where the hell are we and where is the field?' I got on the radio on the preset frequency and tried to make contact. I never got through to anyone in spite of repeating over and over that they were over our field. Then a couple of them came into view and entered the traffic pattern.

The first one landed long, used too much brake and slid sideways off the end of the runway, across the perimeter track and into the mud. From then on it was a complete fiasco. I can't remember the order in which it happened but one ended up in the mud on the right side of the runway about halfway down and perpendicular to it with his nose just over the edge. One landing was so bad that the airplane hit the stalled one with his left wing. He had to be at least 70ft [21m] out in the mud. In the tower we were telling them by radio to go around. We had the landing hut at the end of the runway firing so many red flares it looked like the Fourth of July. All this was ignored and in they came. Some hit the stalled airplane at the end of the runway and in all we had six damaged, three of which had the glass noses which could be used as lead ships.

Needless to say the squadron commander had little to say. As the squadron was totally my responsibility per Gen Anderson I called all the A-26 pilots together and grounded the lot. Those who had landed safely I used to check out the 553rd, the first squadron to get the As.

Then they were given a quick check and used for co-pilots on the B-26s.

We held five briefings for the A-26s but due to weather did not get any of them off. We finally got one off to Brest on September 6 against some strong points as I recall.

I reported to Gen Anderson what I had done with the squadron and that the airplane was practically no different from the B-26 as far as we could use them. He told me to forget the other four missions and go home.

Performance Comparisons

The table shows performance figures derived from the AAF 'Dash One' Flight Operating Instructions handbook. Performance figures are shown assuming similar conditions (i.e., no external load) and are derived from similar columns in each aircraft's performance table. Fuel used for ground runs and climb are included but approximated. No apparent distinction for range was provided for aircraft dropping their bombs at mid-point. The range figure is for comparison only and probably does not reflect a realistic combat radius for each type.

	Douglas A-20G	Martin B-26B	NAA B-25J	Douglas A-26B
Basic specifications				
Crew	2	7	5	2
Powerplant	R-2600-23	R-2800-5	R-2600-13	R-2800-27
Maximum rated horsepower	1,600	2,000	1,700	2,000
Basic empty weight (lb)	17,200	24,000	21,100	22,300
Normal maximum gross weight (lb)	24,000	30,641	33,000	26,000
Combat maximum gross weight (lb)	27,000	36,500	35,000	35,000
Normal internal fuel capacity (gal)	725	962 (1)	974 (2)	925 (3)
Normal bomb load (lb)	2,000	3,000	3,000	4,000
Maximum internal bomb load (lb)	2,000	4,000	4,000	4,000
Maximum continuous power at combat maximum gross weight at 12,000ft				
Power (MP/RPM)	FT/2,300	40/2,400	FT/2,400	42/2,400
TAS (KTAS)	314 (273)	287 (249)	275 (239)	334 (290)
IAS (KIAS)	264 (230)	242 (209)	224 (195)	280 (242)
Range SM (NM)	690 (600)	550 (480)	750 (650)	780 (680)
Fuel burn GPH	290	398	319	386
Fuel burn per SM (gal)	0.92	1.39	1.16	1.16
Normal power at combat maximum gross weight at 12,000ft (includes warm-up and climb fuel)				
Power (MP/RPM)	27/2,000	29.4/2,100	30/2,100	30.5/2,200
TAS (KTAS)	264 (230)	238 (208)	245 (213)	296 (258)
IAS (KIAS)	222 (193)	198 (172)	202 (176)	245 (213)
Range SM (NM)	1,050 (910)	810 (700)	1,120 (970)	1,365 (1,175)
Fuel burn GPH	140	240	205	209
Fuel burn per SM (gal)	0.53	1.01	0.84	0.71
Maximum range at combat maximum gross weight at 12,000ft (includes warm-up and climb fuel)				
Power (MP/RPM)	23.5/1,900	27.9/2,000 (4)	28/2,000 (5)	29/1,950 (5)
TAS (KTAS)	233 (203)	210 (184)	215 (187)	255 (222)
IAS (KIAS)	196 (170)	174 (151)	180 (157)	214 (186)
Range SM (NM)	1,410 (1,220)	1,090 (950)	1,510 (1,320)	1,710 (1,485)
Fuel burn GPH	110	149	135	139
Fuel burn per SM (gal)	0.47	0.71	0.63	0.55

Abbreviations

MP: manifold pressure; RPM: propeller RPM; TAS: true airspeed (mph); KTAS: knots true airspeed; IAS: indicated airspeed (mph); KIAS: knots indicated airspeed; FT: full throttle; SM: statute mile; NM: nautical mile

Notes

1. B-26C: fuel was two main wing tanks at 350gal each; two auxiliary tanks at 121gal each, provisions to carry up to four bomb-bay tanks of 250gal each; maximum internal fuel capacity (no bombs) was 1,942gal.
2. B-25J: fuel was 670gal in the main fuel tanks and 304gal in the auxiliary tanks; provisions made for 215gal in a bomb-bay tunnel tank, a 515gal bomb-bay ferry tank, or a 335gal droppable bomb-bay tank and 125gal in aft fuselage fuel tanks.
3. A-26B: main fuel was two wing tanks at 300gal each, two auxiliary tanks at 100gal each, 125gal bomb-bay tank; provisions to carry a 675gal bomb bay tank for ferrying, 125gal fuselage tank or two 165gal under-wing drop tanks. Maximum combat fuel: 1,380gal.
4. Figures not available for 12,000ft altitude; 9,000ft used.
5. Figures not available for 12,000ft altitude; 10,000ft used.

A-26 Evaluation Missions Flown by 386th BG, September 1944		
Mission	**Date**	**Target**
269	6th	Brest (France) strong points
272	10th	Nancy (France) bridge
274	11th	Metz (Germany) gun positions
276	11th	Leeuwarden Aerodrome (Holland)
277	12th	Scheld (Germany) fortifications
279	14th	Brest (France) strong points
280	16th	Bergen op Zoom Dike (Holland)
282	19th	Duren (Germany) marshalling yards
The combat trials were concluded after Mission 282 and the A-26s were withdrawn from the 386th Bomb Group		

The general conclusion by the 386th Group's leaders was that the A-26 was not much of an improvement over the B-26. But in reviewing some of the comments it would appear that many group personnel assumed that the A-26 had been assigned as a replacement for the B-26 and not just for a combat demonstration. The withdrawal of the A-26 to the depots suggested that the aeroplane was found unsuitable for combat.

The missions flown by the A-26 in September 1944 did not provide a thorough test of the machine since no enemy fighter opposition was encountered to test the defensive systems and no opportunity for low-altitude strafing attacks occurred. A report of 5 October from the Commander of the Ninth Air Force, Gen Hoyt S. Vandenberg, indicated that, though the missions flown 'did not constitute a complete and conclusive test of combat suitability', they did 'establish the fact that the A-26 was a suitable replacement for B-26 and A-20 airplanes in the Ninth Bombardment Division.' He also noted that the A-26s were received at an inopportune due to a lack of targets for their testing at low altitudes and for making maximum use of their forward firepower.[99]

Two weeks later a more comprehensive report was made to the Chief of the Air Staff in Washington. Among its findings, this report concluded that the aircraft was best used at 12,000ft (3,700m) and that the maximum 4,000lb (1,800kg) internal bomb load was satisfactory. Poor visibility from the framed canopy was found, although it was also acknowledged that this problem had already been solved by a new canopy. The maximum mission length flown during the trials was 4h 25min and the aircraft was found to have a greater combat radius than had been expected: approximately 450miles (725km) for formations of eighteen aircraft. Single-engine performance was favourable and the report noted that on one mission an A-26 had lost an engine through anti-aircraft fire but that it returned to base without any difficulties. The conclusion was:

> The A-26 is very effective as a medium altitude bomber. Its large and more variable load makes it superior to the A-20, while the range exceeds both the A-20 and B-26. Its superior single-engine performance is a very important asset. Its speed advantage over the other medium bombers, plus its flying qualities and its maneuverability and ease of maintaining formation, permit longer missions with less crew fatigue. A strong asset is the saving of flying personnel requirements. Excellent visibility in the bombardier nose is one of the greatest advantages. It is concluded that, as a medium altitude bomber, the A-26 airplane has met successfully the tests imposed by combat conditions in ETO.[100]

One senses, though, that the aeroplane was not as well received at the squadron level as was indicated by these reports. No doubt there were some combat crews who favoured the Martin B-26 and did not want to see it replaced. None the less, there was much pressure through the AAF to show the A-26 as a successful and capable combat aircraft and a suitable replacement for the A-20, the B-25 and the B-26.

Certainly there was pressure to get the A-26 into an ETO group as a permanent replacement aircraft and to accelerate the transition from the A-20 and the B-26 to the new Invader. Of the fourteen bomb groups of the Ninth Air Force, eleven were planned to be equipped with A-26s by July 1945. Only three B-26 groups were to remain as part of the expected occupational force at the end of the war.[101] Transfers from the A-20, the B-25 and the B-26 were to continue in the following order: Mediterranean Theater (Twelfth Air Force), China–Burma Theater (Tenth Air Force) and Far East and Pacific Theater (Fifth and Seventh Air Forces).[102]

The transition to the A-26 in Europe was typically accomplished within a particular group while active combat operations continued. Once a group was slated to make the change, pilots were sent through a quick ground school and then given an introduction to the aircraft that usually consisted of a few take-offs and landings. The experience of the 386th BG in February 1945 was probably similar to that of others. The group, by then operating their B-26s from an airfield in France, was expected to continue combat missions while switching to the A-26. When missions were not being flown, ground crews were working hard to run acceptance checks on the A-26s as they arrived from the Ninth Air Force depots in England. Meanwhile, A-26s were making circuits in the traffic pattern with a check pilot and new crews. Pilots would wait on the field's perimeter track for their turn. After an aircraft landed, it would taxi to drop off one pilot and pick up another, and the process would continue. Once the group had the machines and crews checked, the first combat mission would be scheduled with the A-26.

Crews generally adapted to the A-26 quickly, many expressing a rapid attachment to the Invader. This was no doubt due to its improved performance over that of the older Martin B-26 and Douglas A-20, and it was easy to fly and had good single-engine performance. The gun-nosed aeroplanes had massed firepower available that made them potent weapons for low-level attack.

One part of the transition that was hard on the squadrons was the reduced number of crew members needed for the A-26. The A-20s normally flew with three-man crews, while the B-26 carried a six- or seven-man crew. The A-26B required only a pilot and a gunner, leaving a number of surplus pilots, bombardiers, navigators and gunners available for transfer to other units. This change was difficult for close-knit crews that had flown many hours of combat together. Some of the surplus crew members were transferred to the other remaining B-26 or A-20 units or were sent home if they were nearing the end of their combat tours. However, many of the squadrons, particularly those that had transferred from the A-20s, continued to operate the

A-26 with a pilot and two gunners, even though there was only one gunner position. The other gunner rode in the cockpit jump seat and provided an extra set of eyes and hands when needed.

Most Ninth Air Force groups flew a mixture of A-26Bs and A-26Cs, usually three or four of the former for each of the latter. The glass-nosed A-26Cs carried bombardiers and were used as lead aircraft. Some groups, particularly those that transitioned from the Martin B-26, also carried a navigator in the lead A-26Cs, with both bombardier and navigator riding in the no-doubt cosy nose compartment of the Invader. Until sufficient numbers of the glass-nosed A-26Cs were available, some squadrons retained A-20s or B-26s for use as lead ships, though the differing aircraft performance profiles caused difficulties and obviated the advantages of the new aircraft.

The Pacific War

By the end of the war, a total of eleven bomb groups had either transitioned or were in the process of doing so to the A-26. A single reconnaissance group also operated the A-26. As the European war was ending, plans were under way to shift a number of the European and Mediterranean groups to the Pacific in anticipation of the invasion of Kyushu in Japan set for 1 November 1945. The 319th BG, flying B-25s, had already been detached from the Twelfth Air Force in January, retrained on A-26s and deployed to Okinawa for assignment with the Seventh Air Force. The 41st BG was also based on Okinawa and was transitioning to the A-26. The 3rd BG of the Fifth Air Force had just moved up from the Philippines to Okinawa with their new A-26s when the war ended.

Had it not ended suddenly with the employment of the atomic bombs, the first invasion of Japan proper, codenamed Operation *Olympic*, was set for 1 November. The invasion of the main island of Honshu, codenamed Operation *Coronet*, was set for 1 March 1946. War plans and production schedules were developed to support those invasions. AAF planning called for the deployment of seven ETO B-26, B-25 and A-20 bomb groups re-equipped with A-26s. The first of these units, the 319th BG, arrived in Okinawa from the USA in July. Also, all but three of the light and medium groups with the FEAF were to transition to the A-26 in the late summer of 1945, a process under way when the war ended. The three remaining groups, all equipped with B-25s, were to continue to operate that type until available stocks were drawn down, expected in late 1946, and then transfer to the A-26.[103]

In August 1945 both the Fifth and the Seventh Air Force, as well as elements of Marine air groups, were moving up to the Ryukyus (Okinawa and Ie Shima), as twenty-two runways and facilities for fifty-one air groups were rapidly being built. Elements of the Eighth, the Tenth, the Twentieth and the Twenty-first Air Force, plus those of the Fifth and Seventh, were expected to be employed to provide air support for the operations. In all, more than 1.5 million American combat soldiers on the ground, sea and air, were to be committed to the two invasions.[104] As a result of the atomic bombs being dropped, the costly and risky invasions were not needed; the planning, equipment and manpower all quickly became surplus.

What follows is an account of each of the bomb groups assigned the A-26 during the war.

Ninth Air Force A-26 Squadron Fuselage Codes				
386th BG	552nd BS: RG	553rd BS: AN	554th BS: RU	555th BS: YA
391st BG	572nd BS: P2	573rd BS: T6	574th BS: 4L	575th BS: 08
409th BG	640th BS: W5	641st BS: 7G	642nd BS: D6	643rd BS: 5I
410th BG	644th BS: 5D	645th BS: 7X	646th BS: 8U	647th BS: 6Q
416th BG	668th BS: 5H	669th BS: 2A	670th BS: F6	671st BS: 5C

European Theater of Operations: Ninth Air Force

416th Bombardment Group (Light)

The 416th BG was formed on 25 January 1943 and activated on 5 February. It trained in Douglas A-20s. The group consisted of four bombardment squadrons: the 668th, the 669th, the 670th and the 671st. The unit trained at Lake Charles AAF and then Laurel AAF, Mississippi, before deploying to England in January 1944 for assignment to the Ninth Air Force. The group flew its first mission in March while assigned to a base at Wethersfield, Essex. The group moved to Melun, France, in September and later to Laon/Athies and Cormeilles-en-Vexin. In October the group began the transition from the A-20 to the A-26, with the first A-26 mission flown in early November. The 416th BG was the first bomb group to be fully equipped with the A-26 and flew missions up to the end of the European war. The group then returned to the USA, beginning in July 1945, and was deactivated in October.

409th Bombardment Group (Light)

The 409th Bomb Group was formed on June 1, 1943 and trained at Woodward AAF, Oklahoma and DeRidder AAF, Louisiana, equipped with Douglas A-20s. The group consisted of four units: the 640th, the 641st, the 642nd and the 643rd Bombardment Squadrons. The group moved to England in February 1944 and was assigned to the Ninth Air Force. Based at Little Walden, the group flew its first mission in April. In it moved to the continent, initially based at Bretigny and, later, Laon/Couvron in France. In November the group transitioned to the A-26, flying its first mission in the new type on 15 December, against Dreiborn in Germany and continued in subsequent weeks in support of Allied forces during the Battle of the Bulge. The group flew its last mission on 3 May 1945 and returned to the USA the following month. The group was inactivated in November 1945.

386th Bombardment Group (Medium)

The 386th BG was formed on 25 November 1942 and activated on 1 December. The group trained at Lake Charles AAF and was equipped with Martin B-26s. The unit moved to England in June 1943, initially assigned to the Eighth Air Force and then to the Ninth. The group's elements were: the 552nd, the 553rd, the 554th and the 555th Bombardment Squadrons. Initially, the 386th was assigned to a base at Snetterton Heath. The unit moved to



***Disagreeable 4*, a 416th BG A-26C taxies by, probably in France in the spring of 1945. This aircraft, s/n 43-22490, was delivered in November 1944 and immediately assigned to the Ninth Air Force. It flew with the 670th BS and carried the codes F6-X.** Doc Randles via John Horne

Boxted in June 1943, where it flew its first mission in July, and then to Great Dunmow in September. As noted elsewhere, the 386th BG had a squadron of A-26s assigned for a combat demonstration in August 1944, flying eight combat missions in September. The A-26 was not well received by crew members and the group did not transition to the type for another four months. The group was moved to Beaumont-sur-Oise in France in October. In February 1945 the group transitioned to the A-26, turning in their B-26s to depots in England. The group moved again to a base at St.-Trond in Belgium in April, remaining there until the war ended. After the war the 386th BG returned to the USA and was inactivated in November 1945.

391st Bombardment Group (Medium)

The 391st BG was formed on 15 January 1943 and activated a week later at McDill Field, Florida. The group was equipped with the Martin B-26 and had four squadrons attached: the 572nd, the 573rd, the 574th and the 575th. The 391st was based at Godman Field, Kentucky, between September and December and then deployed overseas for assignment to the Ninth Air Force in January 1944. It was based at Matching in England until September when it moved to Roye/Amy in France. The unit moved again to Assche in Belgium in April 1945. In the same month the group transitioned to the A-26 and flew missions with the aircraft until the war ended. The group returned to the USA in October 1945 and was inactivated.

410th Bombardment Group (Light)

The 410th BG was formed on 16 June 1943 and activated on 1 July. It was equipped with the Douglas A-20 and consisted of four squadrons: the 644th, the 645th, the 646th and the 647th. The unit trained at Muskogee AAF, Oklahoma and Laurel AAF. It moved to England in March 1944 and was assigned to the Ninth Air Force, being based first at Birch and then Gosfield. The group moved to the continent in September, being based initially at Coulommiers in France. It flew several



The Eighth Air Force's Harrington-based 492nd BG primarily operated B-24s but also had a few A-26s for their *Carpetbagger* missions, usually deep penetration raids into Germany to drop agents. The A-26Cs were assigned to the 856th BS under the command of Col Rodman A. St. Clair, who also was the pilot of this A-26C, s/n 43-22626, nicknamed *The Saint*. Col Rodman St. Clair via John Horne

night missions in February 1945 using Martin B-26s for flare planes, A-26s for target marking and A-20s for bombing. The unit did not transition from the A-20 to the A-26 until April 1945 and the war ended before they could be used operationally. The unit was returned to the USA beginning in June and inactivated in November 1945.

69th Reconnaissance Group

The 69th Reconnaissance Group (RG) was activated as the 68th Observation Group on 3 September 1941. It was redesignated as the 69th RG in April 1943. Initially, the unit flew patrols along the Pacific Coast after the attack on Pearl Harbor. The unit deployed to France in February 1945 and was based at Nancy. It was equipped with A-26s near the end of the war to supplement its main equipment, the F-6 Mustang. The A-26s were primarily assigned to the group's 10th Tactical Reconnaissance Squadron. The 69th RG returned to the United States in July 1945 and was deactivated in July 1946.



This 416th BG A-26B mushed in at Melun in France, immediately after take-off due to ice accumulation on the wings. Records indicate that the aircraft was repaired and survived the war. The 5C fuselage code indicates that the aircraft was assigned to the 671st BS. Doc Randles via John Horne



***Beautiful Katey* and its pilot, Lt Tom Farr. This A-26B was assigned to the 409th BG.** Don Morrow via John Horne

Mediterranean Theater of Operations: Twelfth Air Force

47th Bombardment Group (Light)

Formed on 20 November 1940 and activated on 15 January 1940, the 47th BG (Light) was equipped with the Douglas A-20. The group was assigned four bomb squadrons: the 84th, the 85th, the 86th and the 97th. The unit was used to patrol the American west Coast in the months after Pearl Harbor and then trained for overseas duty. The 47th BG was deployed to North Africa in October 1942 and assigned to the Twelfth Air Force, with its first missions being flown in December. It was active throughout the Mediterranean Theater, attacking targets in Italy and southern France. In January 1945 the unit began equipping with A-26s while being based in Italy. The unit retained A-20s, however, and flew mixed formations of the two aircraft types while conducting around-the-clock missions against German logistical targets. The group pioneered night interdiction tactics for the AAF. The 47th BG returned to the USA in July 1945 and, fully equipped with A-26s, began specialized training for night attack operations.

Low-Level A-26 Mission Flown on 23 January 1945

The following is an account of a mission remembered by the late Lt Arden D. Connick, a pilot in the 643rd squadron, 409th Bomb Group as recalled for the 409th Group history posted at www.web-birds.com/9th/409/409th_experiences.html

On the morning of January 23, 1945, a small group of pilots and gunners were standing by for a low-level mission to an area of the Ardennes using A-26 aircraft. Briefing was not as thorough as I had hoped. The pilots were each handed a map with an area circled including a road from Dasburg to Arzfeld, Germany. It was reported that the German forces were retreating in this area and many targets of opportunity existed.

Seven 409th aircraft took off from our base at A-48 (located at Bretigny, France, just south of Paris). One aircraft had a landing gear problem so returned to base. Six aircraft headed north-east in formation toward a rendezvous point known only to the lead crew. The weather was not good with snow showers en route to the target area.

On reaching the rendezvous point, which has now been determined to be just west of Clervaus, Belgium, all our six ship formation made a fairly large circle. The briefed plan was to locate or be located by at least two P-51 fighters who would lead our mission to the target. I only saw one P-51 about the time we completed our circle. Before completing that circle, Capt Bills (leader of our mission) ordered us into an echelon of two planes in trail. Incidentally, that radio message from Capt Bills was the only one ever heard from him.

The P-51 led us eastward and lined us up with a road jammed with vehicles of all sorts including some tanks. At this point we were about 800ft [240m] above ground. This road seemed higher than the surrounding terrain – like on a slight ridge. The P-51 up ahead pulled up in a steep climb and disappeared into the clouds above. The road leading to Arzfeld, Germany, was the target.

Ground fire intensified and suddenly the plane I was flying loose formation on received a direct hit and exploded. When things cleared after flying through some smoke and debris the plane was gone. From that point on I was on my own. We were all carrying fragmentation bombs so I dropped mine on the road below then descending to low-level using the forward firing .50 caliber guns. As I descended, I briefly saw another of our planes being hit, trailing smoke and in a descending turn. After this I never saw any of our aircraft again.

As we continued, the ground fire became even more intense. The terrain changed in that the road became lower than the surrounding hills, so we were receiving fire from above as well as below. Then there was a blinding flash and concussion which left a hole visible about 2ft in diameter on the inboard side of the left cowling. That started a fire so the left engine propeller was feathered and the fuel shut off. By this time the intercom failed so I could not get a report from my turret gunner, but the engine fire seemed to go out.

The road was a good continuous target and damage to the enemy was considerable, however the situation soon became untenable. The only option left seemed to be to attempt an escape to the west and get away from that road. The terrain to the south appeared higher so a turn to the left of about 180 degrees was made. The Germans nearly finished us off in that turn, but we survived, still staying low-level. I soon found out that the plane's main electrically operated compass was inoperative, but the old standby compass was used to put us on a westerly heading.

Ground fire decreased a good deal after leaving the road, but a few moments later we were being fired on from a fortified church we came across. We were not heading directly at the church so I could not easily use the forward firing guns, so Sgt Marshall Steele, my turret gunner, gave the church good return fire. We were soon out of range of the church and continued westward with decreasing ground fire until it stopped.

The right engine up to this time was doing well and since the ground fire was nil my thoughts were to climb and bail out or by some miracle find a strip to land on. Those thoughts did not last long because it seemed only seconds later that the right engine propeller ran away, indicating the engine had run out of oil. No choice now other than to try to crash land the airplane. The area was forested, however, we were fortunately over a small clear area so I forced the plane onto the ground because trees were up ahead. There was 18in [46cm] of snow on the ground which helped on the initial impact and skidding to a stop.

We all survived, Sgt James 'Tex' Clark, my other gunner, had been riding up front in the cockpit with me. The A-26 had a one-pilot, one-gunner crew requirement, but two gunners were still being carried as a hold-over from A-20 days that the group previously operated. The extra pair of eyes turned out to be very valuable on the mission and after skidding to a stop Clark got me out and away from the burning plane. Steele was trapped in the turret by twisted metal. The tail of the aircraft had broken off just behind the turret. Some fast action by Clark with a fire ax got Steele free. We were assisted by a Belgium farm couple once they found out we were Americans. We had stopped our skidding a few yards from their farm house.

We had crashed near the village of Houmont, Belgium. Some American artillery spotters had watched us crash land so they dispatched a couple of men in a jeep to help us. In time they got us on our way further behind the front lines toward an evacuation hospital. We went through a system of aid stations used by the infantry to tend their wounded. Nine hours later we did arrive at the evacuation hospital which in this case was some farmer's barn. I eventually ended up in a general hospital in Paris.

Five planes and four crews were lost (12 men total) on the mission. Lt Rocholl managed to make an emergency landing with his damaged aircraft at Luxembourg.

Before this mission was flown, an evaluation was started on the feasibility of using A-26 aircraft for low-level attacks. Admittedly, the A-26 had tremendous firepower for that period (16 forward-firing .50 caliber guns including the turret guns and the ability to also carry a sizeable load of bombs). On the negative side, others thought the A-26 too large and too slow to operate low-level under conditions found in the European Theater. As it turned out, a mission was ordered and flown before any evaluation reports could be forwarded.

After the war, Marshall Steele, tried through various channels, including our National Archives in Washington, DC, for information on this mission. Very little was found. I was contacted in 1993 by an Air War Research Group in Germany that are searching and documenting all German and Allied aircraft lost in action during 1944–45 over their country. They say all German reports pertaining to 409th aircraft lost January 23, 1945, were captured by United States forces and are now in our National Archives. What happened to these and other records is not known.

One other interesting note from this German group says, 'Your plane and others were not shot down by ordinary flak. You were shot down by a German secret weapon. A ground-to-air missile, called *Fohnrakete*, were [sic] at two different locations, Arzfeld in January 1945, and later in the year at Remagen in March. These rockets were shot up in salvos from a small car that looked like a carrier of beer bottles.' This German group still carries on their research at this date [1995].

I was awarded the Distinguished Service Cross for this mission which was presented to me by Gen Henry 'Hap' Arnold at an awards ceremony at Luxembourg in April, 1945.



Striking nose art as carried on *Maggie's Drawers*, an A-26B assigned to the 416th BG. Doc Randles via John Horne



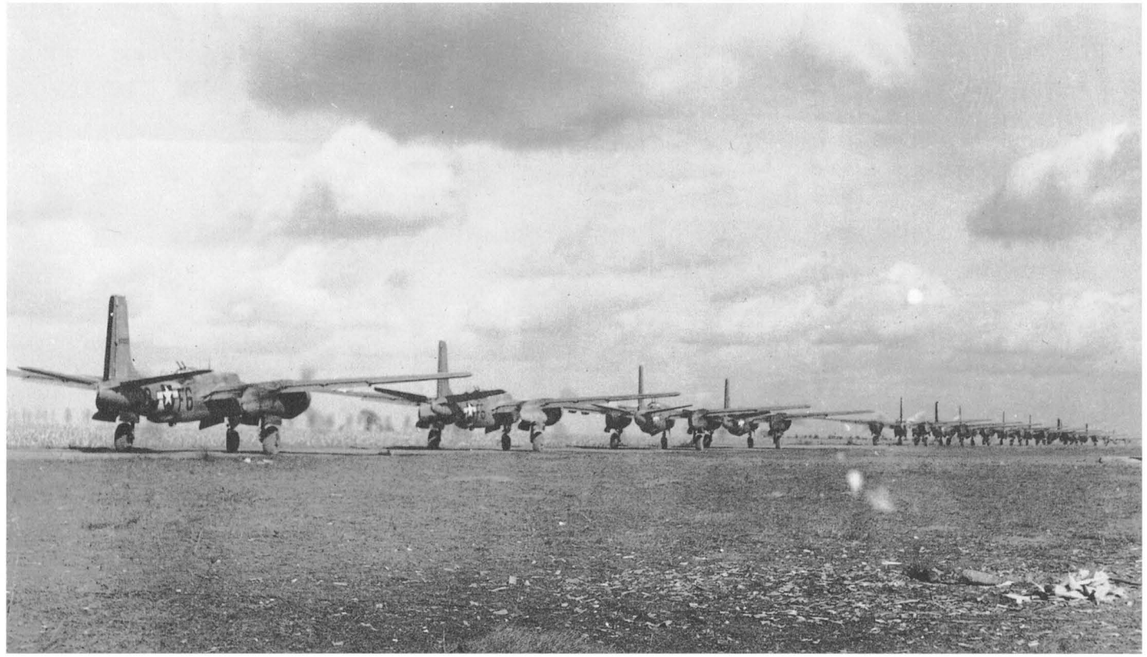
A 416th BG A-26B prepares to take off from an airfield at Melun on 25 December 1944, to support the efforts of the US 3rd Army during the Battle of the Bulge. The 416th flew two missions on Christmas Day, losing four aircraft and having another thirty-nine damaged. This particular aircraft, s/n 41-39211, survived the war to be salvaged overseas. Col Harry Popney via John Horne



Following attacks on the Moselle river bridges at Ediger-Eller in Germany on 27 December 1944, these 416th BG Invaders were forced to divert to St. Dizier in France, due to bad weather. This view shows the aircraft taxiing out for departure the next day. Note that the third aircraft in line is an A-20, still in use during the transition to the A-26. Col Harry Popney via John Horne



An interesting incident for the 416th BG at Melun in November 1944. The aircraft in the background accidentally taxied off the steel matting and got stuck in the mud. The mission was eventually scrubbed and the aircraft in the foreground was returning to its hardstand. The pilot, when confronted with the stuck aircraft, apparently opened his bomb bay doors and salvoed his four 1,000lb bombs which, fortunately, were not armed. The tents in the background were the quarters for the flight crews, an indication of the conditions in France in the fall of 1944. Col Harry Popney via John Horne



The 670th BS preparing for take off at Laon-Athies in France, probably in the spring of 1945. Fifteen A-26s are visible. Doc Randles via John Horne



A mixed-formation of A-26Bs and A-26Cs with the 386th BG during a mission on 20 April 1945, against a German oil storage depot at Deggendorf. The RU fuselage code of the A-26C indicates that the aircraft was assigned to the 554th BS, while the remainder of the formation aircraft carry the AN code of the 553rd BS.
USAF via John Horne



Stinky **was an A-26B assigned to the 386th BG at Beaumont-sur-Oise, France, on 20 April 1945. This aircraft, s/n 43-22369, was assigned to the 552nd BS and carried the fuselage codes RG-A. *Stinky* was salvaged in Germany after the war ended.** USAF via John Horne



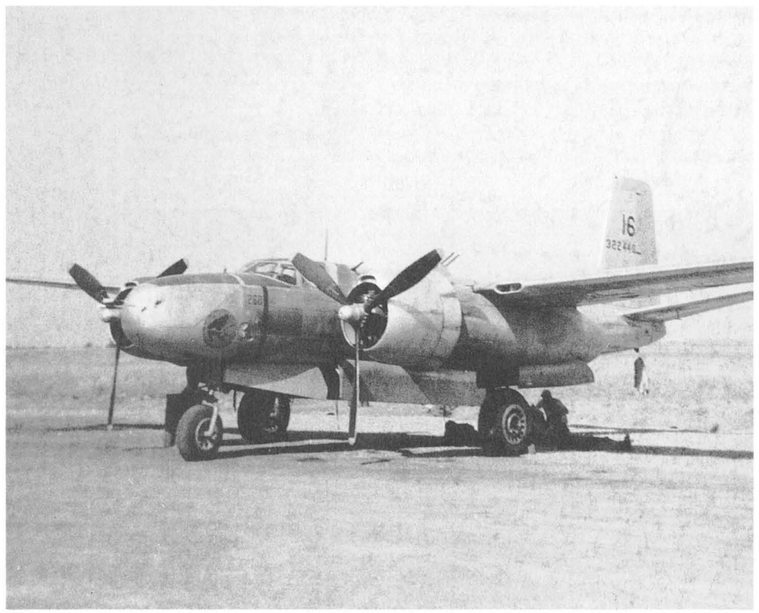
A-26B s/n 43-22337 of the 416BG, 669th BS, probably at Melun in France in the late fall of 1944. It is interesting to note the D-Day invasion stripes on the Invader (fuselage only), a fairly rare occurrence. Records indicate that this aircraft was salvaged in March 1945, probably due to combat damage. Henry Klocksen via AAHS

Far Eastern Air Forces: Fifth Air Force

3rd Bombardment Group (Light)

The 3rd BG dates back to July 1919 when it was formed as the Army Surveillance Group for border patrols in Texas. It was redesignated as the 1st Surveillance Group in August 1919 and then as the 3rd Attack Group in 1921. It was designated as the 3rd BG (Light) in 1939 and equipped with the A-20. The group had the 8th, the 13th, the 89th and the 90th Bombardment Squadrons assigned to it. The unit was

Although belonging to the 84th BS of the 47th BG, this A-26B carries the emblem of the 111th TRS on its nose. This view shows the aircraft, s/n 43-22244, at Grosseto in Italy in May or June 1945, shortly before the group deployed back to the US. The nose emblem was a gold disk with a red devil and a gold bomb. One interesting item to note: the aircraft still carries the Douglas fuselage number 260 on the nose. Harvey Lippincott via Rene Francillion/John Horne



AAF A-26 Inventory, June 1943 to August 1945

	Total AAF	Continental USA	Total Oversea	Total Available against Germany	ETO	MTO	Total Available against Japan	Pacific	FEAF	CBI
Jun 43										
Jul 43										
Aug 43										
Sept 43	1	1								
Oct 43	2	2								
Nov 43	3	3								
Dec 43	6	6								
Jan 44	10	10								
Feb 44	17	16	1							
Mar 44	24	24								
Apr 44	39	39								
May 44	66	62	4							
Jun 44	81	72	9							
Jul 44	113	113								
Aug 44	189	157	32	17	17					
Sept 44	278	171	107	68	68					
Oct 44	380	187	193	131	131					
Nov 44	495	217	278	312	312					
Dec 44	653	309	344	323	321	2				
Jan 45	797	397	400	352	304	48				
Feb 45	941	446	495	407	313	94				
Mar 45	1,152	601	551	494	391	103				
Apr 45	1,319	652	667	619	489	130	2	2		
May 45	1,652	908	744	627	489	138	102	102		
Jun 45	1,906	1,154	752	494	467	27	147	122	17	8
Jul 45	1,927	1,371	556	267	259	8	245	37	120	88
Aug 45	2,049	1,694	355	83	83		248	27	127	94



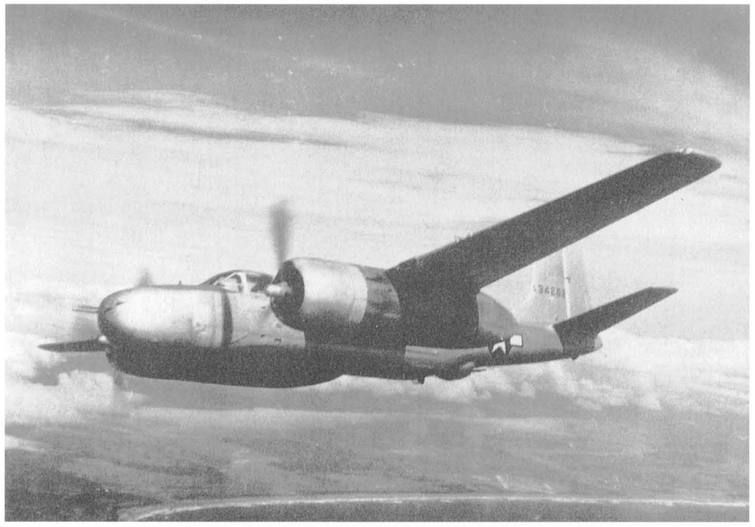
A fierce-looking A-26B, sans guns, from the 405th BS, 38th BG on Okinawa, probably shortly after the war ended. The Fifth Air Force bomb group was in the process of converting from B-25s in the last days of the war. John Horne

attached to the Fifth Air Force in 1942 and began combat operations from New Guinea with its headquarters unit in Australia. The group participated in offensive operations in the south-west Pacific to the end of the war. While operating from New Guinea in May 1944 four early production A-26s were attached to a squadron for combat suitability trials. The group found the A-26 to be inadequate in most respects and refused to operate the aeroplane. General resistance to the A-26 from the commander of the Fifth Air Force, Gen George Kenney, persisted for the following year and the A-26 was not introduced into Fifth Air Force combat operations until July 1945. In December 1944 the 3rd BG moved its bases to the Philippine Islands, attacking the remaining enemy positions there and in Formosa. In July 1945 the unit began transitioning to the A-26 while based at San Jose and flew five missions with the aircraft against Formosa. In mid-July the 3rd BG moved its base to Okinawa and flew a few last missions against targets in Japan before the war ended. The unit moved to Japan in September as part of the occupation air force. The 3rd Bomb Group and its A-26s were still there five years later when the Korean War began.

Pacific Theater of Operations: Seventh Air Force

319th Bombardment Group (Light)

The 319th BG was the only unit that was withdrawn from combat, retrained on the A-26 in the United States and then deployed back into combat. The bomb group was formed on 19 June 1942 at Barksdale AAF, Louisiana, with four bomb squadrons assigned: the 437th, the 438th, the 439th and the 440th. They were equipped with the Martin B-26 and deployed to North Africa, beginning combat operations in November 1942 from bases in Algeria. Eventually, the group operated out of bases on both Corsica and Sardinia. The unit was assigned to the Twelfth Air Force until January 1945, except for a brief period when it was attached to the Fifteenth Air Force between November 1943 and January 1944. In November 1944 the unit transitioned from the B-26 to the B-25 and continued flying combat missions against targets in southern Europe. In January 1945 the unit was withdrawn from combat and reassigned to Columbia AAF, South Carolina, for transition training to the A-26. It was redesignated as a light bomb group in February. The 319th was assigned to the Seventh Air Force and redeployed to Okinawa in early July 1945. The unit flew twenty-two combat missions with the A-26 against airfields, shipping, marshalling yards and industrial centres in China and Japan. Crews from the Group were flying a mission against Kanoya airfield in Japan when they saw the atomic cloud over Nagasaki on 9 August. The unit was returned to the USA in December 1945 and was inactivated.



An A-26B, s/n 44-34252, of the 440th BS, 319th BG, prepares for descent into Machinato, a base on Okinawa. The missions from Okinawa to Japan encompassed a round-trip of up to 1,250miles (2,000km). Wilfred Corey via John Horne Collecton

41st Bombardment Group (Medium)

The 41st BG was formed on 20 November 1940 and activated on 15 January 1941. It was first assigned B-18s and A-29s and later transitioned to B-25s. The unit patrolled the West Coast of the USA during 1942 and 1943 and then moved to Hawaii in October 1943 and was assigned to the Seventh Air Force. The unit moved to Tarawa in the central Pacific for operations with B-25s beginning in December. It flew missions through the area during 1944 and then returned to Hawaii for additional training with B-25s. Redeployed to Okinawa in May 1945, the group began attacks on targets in Japan and China. The unit was in the process of transitioning from the B-25 to the A-26 when the war ended. The unit apparently did not fly any combat missions with the A-26. It was moved to Manila in the Philippine Islands in December 1945 and then inactivated in January 1946.



Above: ***Mighty Mad*, a 319th BG Invader based at Machinato on Okinawa during the last days of the war. Few, if any, of the eight-gun nosed A-26Bs went to the Pacific before the war ended. Most were as *Mighty Mad* with the standard six-gun nose.** USAF via John Blakee/John Horne

Below: **Severely damaged A-26C, possible at Great Dunmow in England. The story behind this machine is not known, but it was undoubtedly scrapped shortly afterwards.** National Archives





***Short Stuff*, an unidentified A-26C in the Pacific or India near the end of the war.** National Archives

China–Burma Theater of Operations: Tenth Air Force

12th Bombardment Group (Medium)

The group was activated on 15 January 1941 as the 12th BG (Light) and trained with B-18, B-23 and PT-17 aircraft at McChord Field, Washington. It patrolled the West Coast after the attack on Pearl Harbor, was then redesignated as the 12th Bomb Group (Medium) and trained with B-25s. The group consisted of four squadrons: the 81st, the 82nd, the 83rd and the 434th and deployed to bases in Egypt in July 1942 and was assigned to the Ninth Air Force. Two squadrons were later attached to the Twelfth Air Force. The group moved to India in February 1944 and, once assigned to the Tenth Air Force, began training with A-26s shortly before the war ended. The group returned to the United States in December 1945 and was deactivated in January 1946.

341st Bombardment Group (Medium)

The 341st BG was activated at Karachi (then in India) on 5 September 1942 and was equipped with B-25s. Four squadrons were assigned: the 11th, the 22nd, the 490th and the 491st. Some of the squadrons, notably the 22nd, had served with other bomb groups earlier in the war. The group entered combat in early 1943 and principally attacked targets in central Burma until 1944. It moved to bases at Yankai in China in January 1944, and continued attacks on China and the former French Indo-China until the war ended. The 341st began a transition to the A-26 in July 1945, the first squadron receiving their new aircraft on 29 July, shortly before the war ended. The bomb group did not use the A-26 in combat. The group moved back to the United States in October and was inactivated shortly afterwards.

Other Units

A number of other groups or squadrons were assigned a small number of A-26s for a variety of missions. One of these was the 492nd BG, one of the 'Carpetbagger' intruder units, based at Harrington, in England. Beginning in early 1945, these all-black Invaders were partly stripped to increase their maximum speed. They were then used to conduct covert missions, codenamed *Red Stocking*, behind enemy lines, primarily to insert agents into Germany. For these missions, the bomb bay had a small passenger compartment installed to allow one or two agents to lie horizontally during the flight; upon reaching the drop zone, the agents were dropped from a low altitude. The A-26s conducted several night missions to position agents in Berlin during the closing months of the war. The B-24 and the Mosquito were also used to conduct similar missions into France.[105]

An Evaluation of the Combat Capability of the A-26 in the War

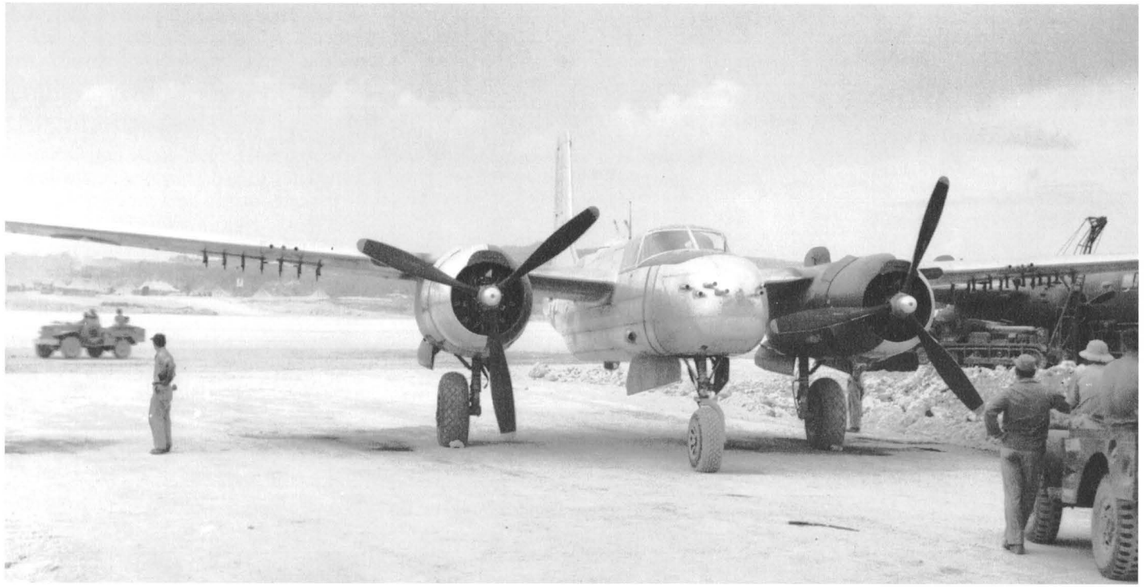
The Douglas and AAF experience with the development and production of the A-26 was marked by frustrations caused by delays, misunderstandings and failures by both parties. By the time the Invader reached the combat theatres in sufficient numbers to be effective, the air war had long since been decided.

The AAF caused most of the early delays in the programme. The three prototypes languished on the ramp at El Segundo throughout a good part of 1942, lacking long-promised government-furnished equipment. All through the development process the AAF

continually changed the armament requirements and, indeed, the entire mission of the aircraft was revised several times. Douglas, for its part, had designed a remarkable aeroplane. However, there were two significant design deficiencies that plagued the A-26: cockpit visibility and wing strength. The AAF first noted concerns about cockpit visibility on the wooden mock-up in April 1941, caused by the large nacelles and a heavily-framed canopy. Though not much could be done to reposition the engines, the design changes that raised the cockpit floor and a provided a new canopy took nearly forty-two months to find their way on to the production line. The A-26 wing was unique, complicated and, as it turned out, not quite strong enough. Ed Heinemann and his team worked to incorporate a laminar flow aerofoil into a strong, yet light wing structure. Unfortunately, when weaknesses in wing loading were revealed during testing, the ability to strengthen the wings was limited by the design. Under other circumstances, the wings would have been redesigned for production, but the programme by then was moving fast enough that a redesign was not practical. The wings were also difficult to build, requiring specialized tooling that further delayed the production process. Questions about wing strength would follow the aircraft through its twenty-five year utilization by the AAF and the USAF. To be fair, however, many later wing problems were attributed to the substantial under-wing loads and high load factors imposed on A-26s during operations in the Korean War. Other design shortcomings hampered the

An early post-war view of parked Invaders, possibly pathfinders modified by Douglas as the war was ending. These aircraft are equipped with SHORAN units (note the antenna in place of the dorsal turret) and radar units in the forward bomb bay. The first aircraft is s/n 44-35958. One of the aircraft in the second line bears the inscription 'Join the Regular Army'. National Archives





Another unidentified A-26B, probably at one of the several bases on Okinawa in August 1945. This aircraft retains the six-gun nose but also has the internal wing guns and the rocket rails. An olive drab B-25 is parked behind the A-26. National Archives

aeroplane. The nose landing gear design caused many gear extension problems. The nose gear also had a tendency to collapse under excessive, but not incredible, loading.

Once the aircraft had reached the production stage, additional extensive and maddening delays caused by subcontractors, tooling and numerous other factors prevented it from reaching combat units in significant numbers until early 1945. With the XA-26 flying in July 1942, it is inexplicable how an aircraft that was urgently needed, granted a high priority and not particularly complicated nor advanced, could none the less take so long to become operational.

The experience of the A-26 in World War II was largely too little, too late. It enjoyed a small measure of success when it was finally in service with operational bomb groups and it was designated as the sole light bomber for the post-war air force. However, it would take the Korean War, fought five years later and after the aircraft was considered obsolete, before the capability of the Invader was fully demonstrated.

CHAPTER SIX

Post-War, Air National Guard, Air Reserve and US Navy Service

The Post-War Situation

By the time the war ended in August 1945 the AAF had accepted approximately 2,450 A-26s for service through its three-year production run. In August 1945, however, there were only 355 Invaders actually deployed overseas in combat theatres, down from a high of 752 deployed at 30 June. Within the continental United States, the AAF carried 1,694 A-26s in its inventory, not including, evidently, those already held in storage.

Through the middle 1945 the AAF continued a process of evaluating its aircraft requirements against its production contracts. That A-26 production was finally hitting its stride, with the high mark of 318 aircraft accepted in May 1945, had little impact on the war effort at that late date. In fact, as the war ended with unexpected swiftness, the problem became not one of production but, rather, what to do with hundreds of A-26s among the thousands of new but unneeded aircraft in the logistical pipeline.

The AAF and the government had studied the demobilization of the war economy beginning as early as 1943. For aircraft, it was left to the individual services to establish their post-war requirements, subject to budget limitations. Any excess would be disposed of either through military assistance programmes or, domestically, turned over to the surplus property disposal arm of the government, the Reconstruction Finance Corporation (RFC). Overseas disposal was to be administered by the Foreign Economic Administration, but, in practice, local commanders arranged to have their foreign inventory reclaimed or salvaged.

The AAF was forced, as were the other American services, into a rapid demobilization by political pressure and severe budget cuts. Between August 1945 and April 1946 the AAF personnel strength fell from 2.2 million to 485,000, while the number of air bases dropped from 783 to 177. It was a chaotic and confusing period. The carefully laid plans of 1944 collapsed under the demobilization pressure. By 1947 the RFC and its successor organization, the War Assets Administration (WAA) had processed more than 61,000 ex-military aircraft for disposal. Of these, approximately 27,000 were combat aircraft and were mostly sold to civil contractors for scrapping and smelting.

As far as can be determined, the AAF relegated few A-26s for immediate disposal. There were 'war wearies' that were salvaged on site in France and the Pacific. However, for the most part the AAF valued its A-26 inventory and placed most of them in storage. It was not until the late 1940s that stored A-26s were released for reclamation, primarily to provide parts for those still in service.

Europe

For the A-26s deployed in the ETO, most were earmarked either for the occupation air force in Germany or, before the end of the war, for redeployment to the China–Burma–India (CBI) and the Pacific Theater. The Ninth Air Force was designated as the European occupation air force, with several heavy bomber groups equipped with B-17s, as well as medium- and light-bomber groups, fighter groups and other support units assigned and based in Germany. At the end of April 1945 the Ninth Air Force inventory of A-26s stood at 424, remaining close to that level until the end of June. For the occupation, eighty A-26s were authorized for equipping two light groups. Of the remainder, most were to be deployed to the CBI. However, the transfer of Invaders was delayed due to the need to install simplified oxygen systems in the aircraft and the required parts did not arrive until June. By the end of July,

Early in the post-war period, this view shows the sixth production A-26B, s/n 41-39105, in storage, most likely at Patterson Field, Ohio. The first few production aircraft featured hand-built nose sections with provision for the installation of a 75mm cannon. Note the under-wing provisions for external loads and that the wing flaps have been removed. Most of the early models were salvaged during the war, but this survived as a TB-26B and was transferred to the French L'Armée de L'Air in January 1960.
William T. Larkins





Surprisingly, the late production A-26Bs earmarked for the Pacific and finished in the overall olive-drab camouflage retained that scheme through the post-war period. This example was delivered in late July 1945 and the view shows the aircraft a year later, in August 1946. There were a number of the olive drab A-26Bs with the 3rd BG when the Korean War started. William T. Larkins via Dave Menard

though, the number of A-26s still in Europe had dropped to 257 but, with VJ Day, thirty-four A-26s in transit to the CBI were returned to the control of the Ninth Air Force. At the end of August the Ninth Air Force had 128 A-26s on hand, forty-eight higher than the authorized level. Many of the A-26s were flown from airfields in France to Oberpfaffenhofen Air Depot in southern Germany, where, along with new B-17s, P-51s and P-47s, they would remain stored for several years.[106]

A number of B-26 groups remained in France through the fall of 1945 and these units continued the planned transition to the Invader. The 397th BG was equipped with the A-26 shortly after the war ended and operated it until the late fall when the unit was deactivated. Two medium B-26 groups, the 344th and the 394th BG, remained attached to the Ninth Air Force for occupation duty. Both groups were reclassified as light groups and also transitioned to A-26s in the fall of 1945, their old B-26s being stripped, stored and eventually dynamited on air depots in Germany. The 344th BG moved to Schleissheim in Germany, while the 394th BG was based at Kitzingen, also in Germany, after September. How many A-26s these two groups actually operated is not known, but available records suggest that most A-26s in Germany remained at Oberpfaffenhofen in storage. The two groups were transferred, without equipment, back to the USA in February 1946 and deactivated. The A-26s remained in storage for several more years and eventually most were either scrapped at Oberpfaffenhofen, assigned to other USAF units in Europe or transferred to foreign countries such as Turkey.

The operational A-26 bomb groups in Europe on VE Day moved as units back to the United States in summer 1945 and were subsequently deactivated. The aircrews flew their A-26s back while the ground crews were either transported on heavy bombers being ferried or sailed across the Atlantic. The personnel, if qualified, were discharged and the aircraft sent to storage depots.

An example was that of the 409th BG, stationed at Laon/Couvron in France when the war ended. As recalled by 641st BS pilot Arthur Schuler, his squadron moved their A-26s to Cambrai on 16 June 1945,



This A-26B, believed to be s/n 44-34307, was assigned to the National Advisory Committee on Aeronautics (NACA) for aerodynamic research. A number of reports on the A-26 were produced between 1943 and 1945. This view was taken in July 1945. NACA



This A-26B appears to be in temporary storage at Chanute Field in 1945 or 1946. Note the Martin B-26 parked in the background. Col O.C. Griffith via Dave Menard

where they were fitted with long-range bomb bay tanks. He remained there until 4 July when given orders to join a three-element flight returning to the USA, with the squadron commander Lt Col Leo Hawel leading the flight. They departed and flew south across France, then westward off the coast of Spain to Marrakesh in Morocco, where they spent the night. They departed the next morning for Dakar, on the west coast of Africa, where they waited for two days for the weather to improve. The flight of three left Dakar, proceeding direct to Fortaleza in Brazil, bypassing the Ascension Islands because of the weather. Despite this they arrived in Brazil 8 hours later. On 9 July they flew to Atkinson AB at Georgetown, British Guiana (now Guyana) and then to Puerto Rico on the following day, continuing to Morrison Field at West Palm Beach, Florida. On 11 July the A-26s flew on to Hunter Field at Savannah, Georgia, where the crews left the aircraft. The ferry flight took more than 38 hours, flown over the span of a week. The 409th BG reassembled in October at Westover Field, Massachusetts, but with so many men released from service, it was just a shell of its former self and was soon deactivated.[107]

The Mediterranean

From the Mediterranean Theatre of Operations (MTO), the 47th BG remained one of the few active A-26 units through the post-war period. The group moved from Pisa in Italy, back to the United States in July 1945 and, after brief stays at Seymour Johnson AAF, North Carolina and Lake Charles AAF, went to Biggs AAF near El Paso, Texas, for the post-war period. The group became a pioneer in night interdiction tactics and those efforts continued through the late 1940s. Though equipped with Douglas B-45s in 1948, the group was deactivated in 1949 and many of the night interdiction lessons would have to be relearned during the Korean War.

The Pacific

In the Pacific the Fifth Air Force was assigned as the major component of the occupation air forces. The 3rd BG, based on Okinawa on VJ Day, moved to Atsugi AB in September 1945 with its A-26s. The group would later move to Yokota AB and then, in March 1950, to Johnson AB in Japan, where the group began its operations in the Korean War three months later. The 41st BG moved from Okinawa to the Philippines and was deactivated there in early 1946. Most of the other A-26 groups in the CBI and the Pacific area began their own deployment back to the USA and deactivation through the fall of 1945 and early winter of 1946.

In the USA

As the bomb groups were deactivated, their A-26s were placed in storage until AAF requirements could be determined. Those A-26s in the pipeline, either earmarked for overseas duty or for training units, were, for the most part, also flown to selected depots for short-term storage. Unlike many of the contemporary B-17s, B-25s, B-26s and other surplus types, none of the AAF A-26s were released to the RFC for disposal. There were no ex-military A-26s available for civilian purchase during the immediate post-war period. Those A-26s sold by the RFC in 1946 were excess production aircraft not accepted by the AAF but paid for by government contract and thus eligible for sale.

By October 1945 the AAF inventory numbered over 35,000 aircraft, of which 24,000 were active and 11,000 were in storage. Seven months later the inventory of stored aircraft exceeded 15,000, while the active aircraft had been reduced in number to slightly over 8,200. Most of the A-26 inventory was stored, with aircraft concentrated at Hobbs AAF, New Mexico, the Ogden Air Depot at Hill AAF, Utah, and at Pyote AAF, Texas. Beginning in 1948, these aircraft were shifted to be stored primarily at the air depots at McClellan AFB, near Sacramento, California and at Hill AFB.



Left: **One of the early production A-26s on the ramp at Long Beach. The first fifteen Invaders were built with 75mm cannons installed in the hand-built nose sections. The small opening on the tip of the nose was for a gun camera. The pilot is unidentified but appears to be an AAF officer.** Boeing Historical Archives

Right: **This On Mark *Marksman* was eventually purchased by the Garrett Corp. and modified to accept test engines in a nose mount. Based at Phoenix Sky Harbor, Arizona, N256H (s/n 41-39221) was used by Garrett and, later, Allied Signal, from the 1970s until the early 1990s. After retirement, it was donated to a local school district for use as an instructional aid.** Allied Signal via Nicholas A. Veronico



Below: ***KTTV Channel 11*, named after a Los Angeles television station, is shown here inbound to target during the Korean War. The B-26B, s/n 44-34571, was assigned to the 729th BS of the 452nd BG.** John Horne Collection



Right: **A Tulsa-built A-26B on a training flight from Florence Field, South Carolina, probably in early 1945.** Boeing Historical Archives



Below: **Line-up of A-26Bs assigned to a training unit at Florence Field, South Carolina, in early 1945. Most of the training on the A-26 was conducted at Florence Field or Lake Charles, Louisiana.** Boeing Historical Archives



Typical markings for a Korean-era B-26, this example being s/n 44-35555 at Kimpo in late 1953. Bowlus via John Horne





Left: **One of the Calspan test platforms, N9146H (s/n 44-34165) at Edwards AFB in July 2001. The aircraft is in storage for future display at a new museum under development.** Ron Strong

Right: **An A-26C of the 386th Bomb Group at St. Trond, Belgium, in the spring of 1945. The cowlings were painted with insignia blue paint, the only colour available in sufficient amount, to reduce the glare coming off the natural metal finish.**
Richard H. Denison





Left: **A-26B s/n 43-22341 during engine runs with the 386th Bomb Group at St. Trond, Belgium, in the spring of 1945.** Richard H. Denison

Below: **The last days of a B-26B at Davis-Monthan AFB in November 1969.** Gordon Reid







Above: ***Rat Poison*, an A-26C of the 386th Bomb Group with Maj Stewart Marquis (pilot) in the cockpit and Capt Richard Denison (navigator) standing nearby. These A-26Cs were evidently not fitted with the twin .50 calibre nose guns.**
Richard H. Denison

Left: ***Feeding Frenzy* on the ramp at Orange County Airport, California, in December 2000. Operating as N34538 (s/n 44-34538), the B-26C is owned by Martin Aviation.** Scott Thompson

Right: **A late view of the Lockheed Air Services *Super 26*, N52NM (ex N5052N, s/n 44-35999) at Albuquerque, New Mexico, in October 1972. At this point the aircraft was owned by Westernair. It was eventually purchased by Airspray and used for parts to support its air tanker fleet until destroyed in a hangar fire in October 2000.** Gordon Reid





Above: **Seen on the grass at the National Warplane Museum's airshow at Geneseo, New York, in August 1987, this view shows *Rude Invader*, NL81797 (s/n 44-35752).** Scott Thompson



Right: **One of the air tankers operated by Lynch at Billings, Montana, this aircraft is probably better known for its prominent role in the film *Always*. N4918E (s/n 44-35371) still retains the *Fire Eaters* insignia from the film in this May 1997 view.** Scott Thompson



Left: **A discarded Navy UB-26J, BuNo 89076, at Davis-Monthan AFB in November 1969. From the markings, it appears that it was last assigned to Utility Squadron Two, Detachment A.** Gordon Reid

Below: **B-26C s/n 44-34423 on display at an air park at Fairchild AFB, Washington, in this July 1996 view.** Scott Thompson

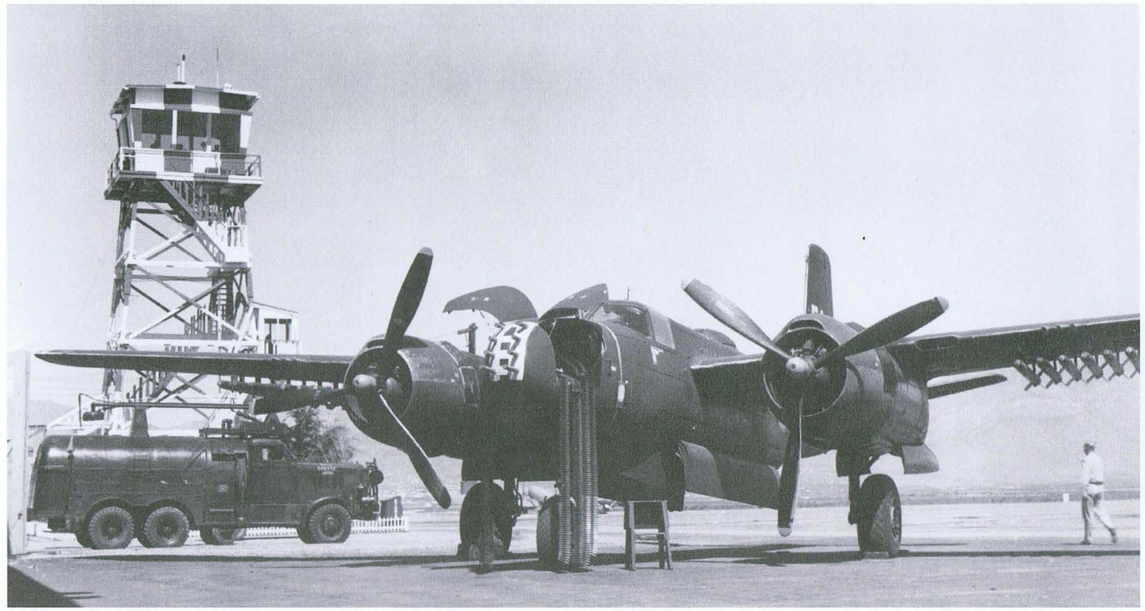




Above: **A 386th Bomb Group A-26B (s/n 43-22343) over Belgium banks away from the camera in this early 1945 wartime shot.** Richard H. Denison



Seen on the ramp at Meacham Field near Fort Worth, Texas, is N26RP (s/n 41-39161) in May 1991. Scott Thompson



The 47th BG was one of the few active-duty post-war units equipped with the A-26. The group returned from the Mediterranean Theater in August 1945 and was based at Biggs Field, Texas, between October 1946 and November 1948. The group specialized in night interdiction tactics with the Invader. This knowledge was largely lost when the unit was inactivated in October 1949 and had to relearned in 1950.
National Archives

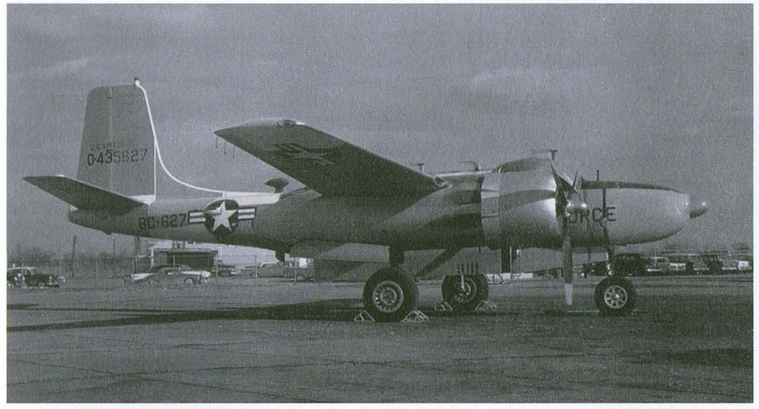
Another point of confusion for the type was the similarity between the A/B-26B and the A/B-26C series. Though there actually were some small technical differences between the two series, the essential difference was which nose was installed: the bomber nose or the all-purpose gun nose. The USAF had the peculiar custom of redesignating any B-26B with a bombardier nose as a B-26C, and vice versa for the solid-nosed models. This practice was unusual but understandable given that the B and the C series were contemporary aircraft and not improved versions of an earlier model, as was usually the case.

Active USAF B-26 Units

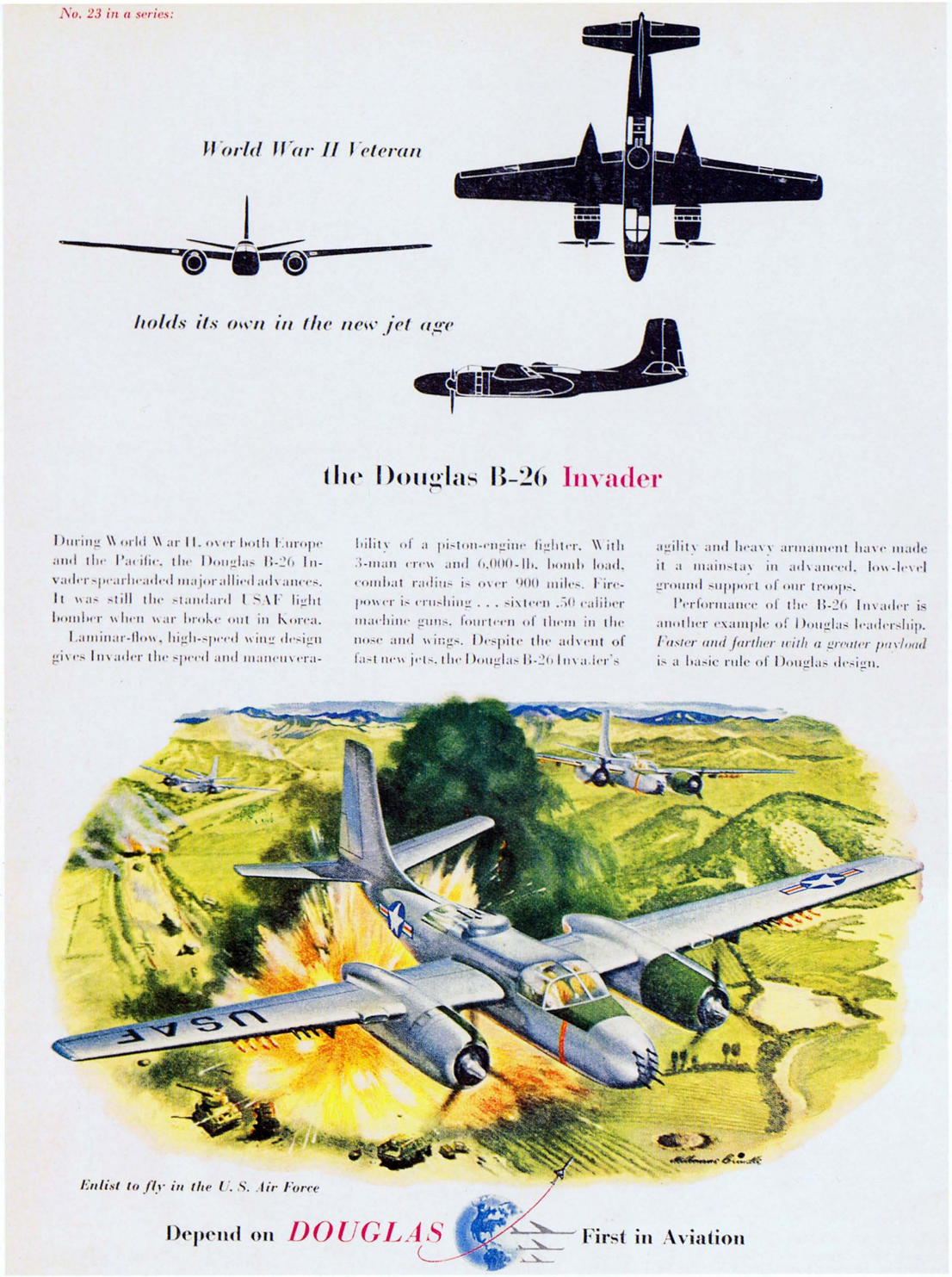
Most of the AAF groups that transitioned to the A-26 aircraft in the last days of the war were deactivated by early 1946. It appears that only two light bomb groups remained active through the immediate post-war period – the 3rd BG in Japan and the 47th BG in Texas. With the beginning of the Korean War a number of other USAF units were activated, some with reserve or ANG personnel. Most of these units were assigned to the Tactical Air Command (TAC) and equipped with new Martin B-57s when they became available.

3rd BG (Light)

This remained as part of the occupation air forces in Japan and was on hand when the Korean War began.



Through the post-war period the USAF developed a number special mission prefixes for their aircraft. This aircraft was designated as an EDB-26C, indicating its use as drone aircraft controller that was exempt from certain of the maintenance technical orders developed for the B-26. The purpose of the small antenna on the nose is unknown but probably related to the drone mission.
Dave Menard



Korean war-era Douglas advertisement for the 'obsolete' B-26 shows the pride that the company still took in its design.



This unusual A-26B, s/n 44-34137, was used to conduct parachute braking tests. The outer wing sections were cut off and other equipment removed to lighten the airframe. The tests series was concluded by 1948 and the aircraft was then scrapped. National Archives

A number of A-26s also continued to be stored at Pyote Field. These aircraft remained in storage until needed for later US Air Force (USAF) requirements, which dramatically increased in the summer of 1950 with the beginning of the Korean War. In some cases stored machines were salvaged and scrapped at the storage site to provide parts for operational aircraft.

The AAF developed plans that included equipping units of the Air National Guard (ANG) and the Air Reserve with stored aircraft. The ANG was organized to consist of eighty-four squadrons requiring 4,000 aircraft. The Air Reserve was earmarked 3,200 aircraft to equip thirty-four groups.[108]

In September 1947 the Army Air Forces were broken away from the Army and established as the USAF. Part of the reorganization effort saw the revision of the aircraft designation system used by the AAF and its predecessors, which was largely unchanged from the 1920s. In June 1948 the revised system was put into place. Two of the significant changes were that the 'A' designation for attack aircraft and 'P' for pursuit aircraft were eliminated and any such aircraft received new designations. The pursuit designation was replaced by an 'F' for fighter. The earlier use of 'F' had been for photographic aircraft and the series had not gone above Northrop F-15. Thus the P-51 became the F-51 without confusion or conflict. However, the attack aircraft were redesignated as light bombers and the A-26 thus became the B-26. Since all the Martin B-26s had long since been shed from the AAF inventory, no conflict was anticipated. This may have been the case in the USAF, but it has caused endless confusion for the general public since the Douglas B-26 and the Martin B-26 have shared overlapping heritages and memories in the ensuing years. For the official Air Force, however, an A-26B became a B-26B and the A-26C became the B-26C. All block designations continued unchanged.

A number of B-26s were used to test the concept of aircraft carrying under-wing cargo pallets. Each wooden pallet contained landing skids and a nose wheel; theoretically, the pallets were to be used in forward combat areas where they could be released at low altitude into small fields. This A-26C is s/n 44-35678. National Archives





Above: **The prototype XA-26 in flight over southern California, probably in early 1943. Note that the outer cowlings have been painted yellow. The XA-26 was not accepted by the AAF until February 1944.** Boeing Historical Archives



Outdoor production at Douglas-Long Beach in the summer of 1944. Dozens of aircraft were often held up from delivery due to shortages of a few critical parts. Boeing Historical Archives



TB-26C s/n 44-35254 was assigned the 4th Technical Training Squadron at George AFB, California, in this July 1957 view. Merle Olmsted via Dave Menard

47th BG (Light)

This remained active through the post-war period with its A-26s and specialized in the development of night interdiction tactics. Based at Biggs AAF, Texas, the unit re-equipped with North American B-45 Tornados in 1948.

345th BG (Light)

This group was a World War II B-25 unit inactivated at the end of the war. It was reactivated in July 1954 at Langley AFB, Virginia and equipped with B-26s. Assigned to the TAC, it was soon re-equipped with B-57s.

461st BG (Light)

A World War II B-24 heavy bomber group, this was reactivated in December 1953 at Hill AFB as a light bomb group, equipped with B-26s and assigned to the Ninth Air Force. The group later re-equipped with B-57s.

There were also several tactical reconnaissance squadrons (TRS) that were equipped with RB-26Cs and assigned to Tactical Reconnaissance Groups (TRG).

10th TRG

This was activated in Germany in July 1952 and assigned to the US Air Forces in Europe (USAFE). Based at Furstenfeldbruck AB, the group was assigned a single, undetermined RB-26C Tactical Reconnaissance Squadron that transitioned to RB-57s beginning in 1954. The 10th TRG and a reserve unit, the 66th TRG, provided reconnaissance support for NATO operations during the 1950s.

Special Mission A-26s and B-26s

The AAF and the USAF developed a number of mission-designator prefixes that were applied to an aircraft type to denote special missions or modifications to the basic aircraft. For the A-26 these were used to a limited extent before the creation of the USAF, the most noted example being the camera-equipped FA-26 of World War II. After June 1948 the system enjoyed wider use and most B-26s not assigned directly to a bomb group were assigned a special-mission prefix. The following lists those prefixes known to have been assigned to the Douglas Invader.

CA-26: at least one example, CA-26B s/n 44-34643, has been noted and was applied to an aircraft assigned to transport duties. Aircraft so designated became CB-26s after 1948.

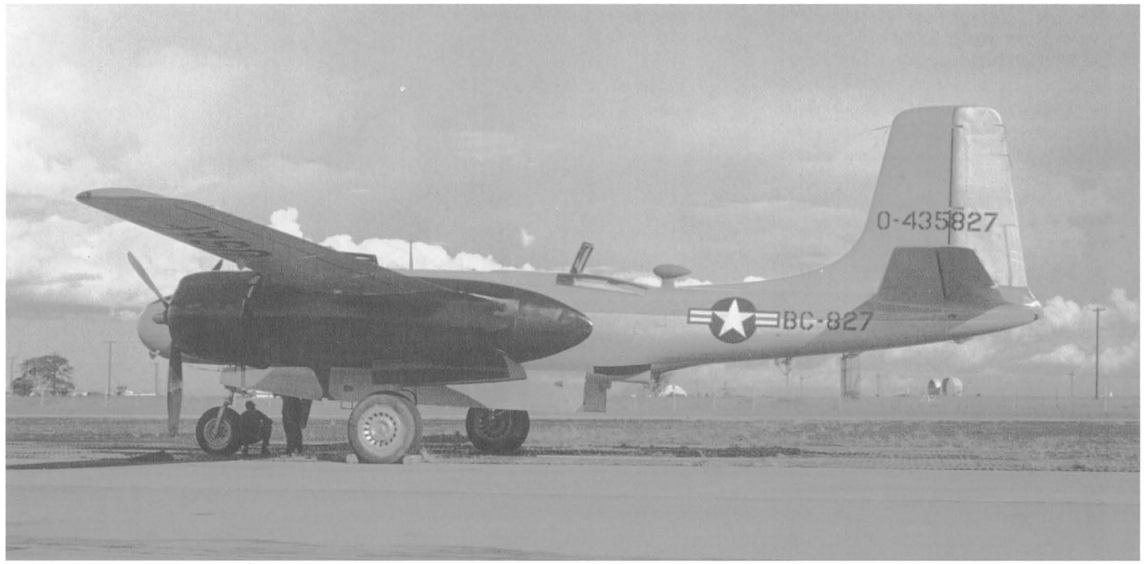
FA-26: the FA-26 designation was applied to a few Invaders which were equipped for photo-reconnaissance. These aircraft were redesignated as RB-26s after 1948.

TA-26: the TA-26 designation was assigned in some cases to Invaders attached to training units. These aircraft were often redesignated as TB-26s later. One example was TA-26C s/n 44-35234.

VA-26: at least one example, VA-26B s/n 44-34622, has been identified. This designation was applied to VIP-assigned Invaders before 1948.

CB-26: the CB-26 designation was applied to selected B-26s used for transport, one example being CB-26B s/n 44-34643. In many cases CB-26s were also designated as VB-26s during their employment.

DB-26: the DB-26 designation was applied to those few B-26s used as mother ships for radio-controlled target drones, one example being DB-26B s/n 44-34652 that carried Ryan Firebees for use as fighter-interceptor targets.



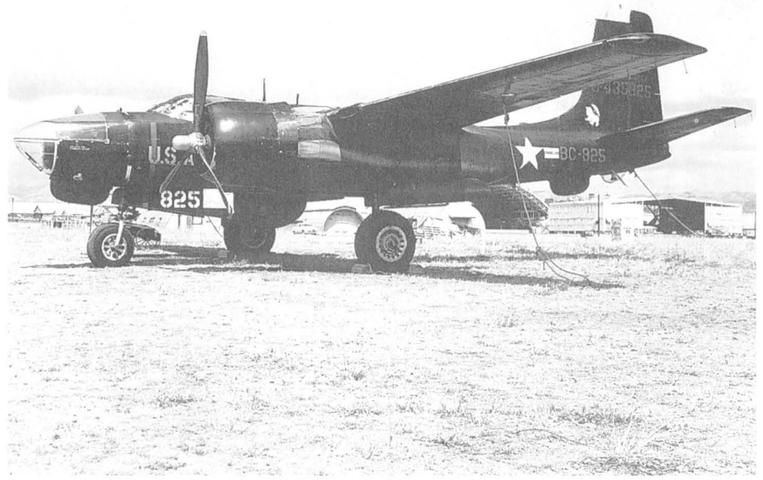
EB-26: designation applied to those B-26s usually bailed to defence contractors for research and development work. The 'E' indicated that the aircraft were exempt from the applicable USAF technical orders. Several aircraft with this prefix were designated as ETB-26 with one example, s/n 44-34606, beginning as an ETB-26B but later becoming an ETB-26C with a nose change.

GB-26: GB-26 was the designation applied to permanently grounded airframes, particularly those used for maintenance training. Several GB-26Bs were assigned to Tyndall AFB, Florida, while one example, GB-26B s/n 44-35232, was used as a training aid at Albrook AFB, in the Panama Canal Zone. This was reportedly the last B-26 on the USAF inventory until it was retired in June 1974.

JB-26: the JB-26 designation was applied to Invaders temporarily modified for a special test role. One example was JB-26B s/n 44-34216, assigned to the Air Proving Ground Command at Eglin AFB, Florida. Often these aircraft were designated as JTB-26, such as JTB-26B, s/n 44-34361, when assigned to Holloman AFB, New Mexico.

Above: **Both the USN and the USAF used the B-26 to tow targets for aerial gunnery training. This B-26B is shown at Clark AB in July 1958. Note the tow equipment installed in place of the ventral turret. The paint scheme is orange upper surfaces and natural metal lower surfaces.** Merle Olmsted via Dave Menard

Below: **A number of RB-26Cs were based at Clark AB through the 1950s. Details of the missions conducted by these aircraft remain obscure. This example, s/n 44-35825, has a number of unusual antennas installed that supported the surveillance equipment carried in this June 1947 view, when the aircraft was being placed in storage. The large antenna located in the forward bomb bay was for the AN/APQ-13 navigation radar, while the blade antenna under the nose was part of the AN/APA-17 direction finding unit. This aircraft had been assigned to the 11th Tactical Reconnaissance Squadron.** Merle Olmsted via John Horne



NB-26: the NB-26 designation may have been applied to individual aircraft permanently modified for a test or research programme, though no B-26s have been identified as carrying this designation.

RB-26: the FA-26 was the initial designation for camera-equipped Invaders and was changed to RB-26 in 1948. All FA-26s still in service were redesignated as RB-26s. Limited numbers of B-26Bs and B-26Cs were converted for use as reconnaissance aircraft. The gun turrets were removed and the bomb bay adapted to carry additional equipment, depending on the intended mission; for example, night reconnaissance aircraft were fitted with a photo flash 'bombing' system. Converted aircraft generally used the simple RB-26 designation, although aircraft fitted with a bombardier's (clear) nose could be RB-26C while the solid-nose type was the RB-26B.

TB-26: generally, the TB-26 designation indicated an aircraft used for aircrew training. However, the designation was also applied to a number of B-26s assigned to roles from target towing to squadron transports.

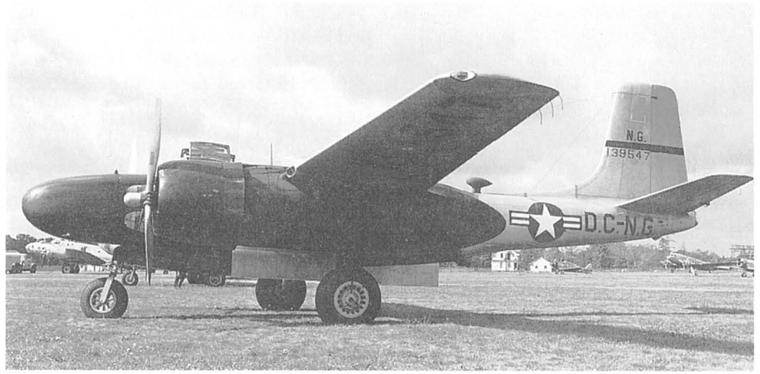
UB-26: designation given to the Navy JD-1s after 1962 and denoting utility use.

VB-26: the VB-26 designation was applied to those B-26s ostensibly assigned to VIP transport. As the aircraft was generally cramped and noisy, most applications were aircraft assigned for fast administrative transport. Among the more distinguished was VB-26B s/n 43-34610, assigned to the Air National Guard Bureau and the last operational Invader in the USAF inventory when it was retired in October 1972.

WB-26: designation applied to those B-26s employed in weather reconnaissance and, as often as not, these aircraft were often designated as RB-26s at some point during their utilization. The redesignation may have been for political appearances. One example was WB-26C s/n 44-35241 as assigned to the 67th Tactical Reconnaissance Wing with the FEAF during the Korean War and through the 1950s. A number of WB-26 (and RB-26) aircraft were also modified for electronic reconnaissance. These aircraft had two electronic-warfare officer (EWO) positions added, one in the cockpit and one in the gunner's compartment. A variety of sensors were added, including two AN/APA-17 units that required several blade and stub antennas to be added to the fuselage. Also installed was a AN/APQ13 navigation radar in the forward bomb bay and operated by the navigator. A number of these aircraft were operated from Clark AB during the 1950s.

Another 11th TRS electronics intelligence (ELINT) RB-26C, this one carrying the name *Snooper*, being placed into storage at Clark AB in 1957. Merle Olmsted via John Horne





This B-26B of the Washington, DC National Guard is indicative of the ANG markings usually carried on assigned aircraft. The inscription *US Air Force* on the vertical stabilizer has been replaced by NG, and the under-wing buzz numbers, barely visible in this view, are prefixed with NG also. William J. Balogh, Sr. via Dave Menard

Air Reserve A-26/B-26 Units

The Air Reserve programme for the new USAF began to draw upon the stored supply of surplus aircraft. In 1948 the redesignated B-26s, C-46s and C-47s, among others, were selected for use with the Air Reserves. The USAF made contractual arrangements for Douglas to recondition fifty-nine B-26s stored at the Ogden Air Depot at Hill AFB. These aircraft were pulled from storage, made airworthy and flown to the Douglas facility at Long Beach for overhaul and refurbishment. They were then assigned to reserve units as needed. Although the following listing is not comprehensive, it is indicative of the reserve units equipped with the A-26 or the B-26.

The *66th TRG* had seen service as an observation group during World War II and was then allocated as a reserve unit in New Jersey during the post-war period. Activated in December 1946, the unit was equipped with RB-26Cs and RF-80s. The unit was called to active duty in May 1951 but deactivated shortly afterwards when personnel and equipment were transferred. Reactivated again in 1953 and equipped with RB-26Cs and RF-80s, the unit moved to Sembach AB in Germany in July 1953. They transitioned to RB-57s and RF-84s, beginning in 1954.

The *310th BG (Light)* was a B-25 medium group during World War II. It was deactivated in September 1945 and allocated as a reserve unit. It was activated in December 1946 at Bedford AAF, Massachusetts and equipped with A-26s. It was inactivated in June 1949.

The *323rd BG (Light)* was a B-26 medium group during World War II. It was deactivated in December 1945 and allocated as a reserve group. It was reactivated in September 1947 at Tinker AAF, Oklahoma and equipped with A-26s. It was inactivated in March 1951.

The *452nd BG (Light)* had been a heavy bomber group equipped with B-17s during World War II. It was inactivated in August 1945 and allocated to the reserves, then redesignated as a Very Heavy Bomb Group. In June 1949 it was redesignated as a light bomb group, equipped with B-26s and based at Long Beach, California. It was mobilized on 10 August 1950 for duty in Korea, where it became the second of two light bomb groups in action.

Air National Guard A-26/B-26 Units

The Air National Guard became an important component of the post-war Air Force. As the AAF processed through its post-war planning in the latter stages of the war, it envisioned a large, standing, independent air force composed of 105 combat wings fully trained and capable of inflicting rapid and massive damage on any belligerent enemy of the United States. Unfortunately for the planners, the budget and political climate would not support such a force, a fact quickly made evident in the rush to demobilize and cut military budgets. The AAF was forced to drop its expectations, first to seventy combat wings and then back to fifty-five, many of which would be understaffed and under-equipped.

The AAF and the later USAF leaders did not want to rely upon reserve forces to bring it up to combat strength in the event of war, but realities forced the ANG to a prominent role in the USAF. The Guard, for its part, lobbied heavily to have an important part of the post-war defence structure. What evolved between the AAF and the National Guard Bureau was an agreement to support eighty-four ANG flying squadrons spread through the states and territories, with the majority being fighter interceptor units for continental air defence. The expected staffing of the ANG would be approximately 58,000. With this understanding, AAF planners worked the aircraft requirements into their post-war planning with stored aircraft earmarked for Guard units.

For the most part, the early ANG units, those activated in 1946 and 1947 before the Guard was formally established, were equipped with P-47s and P-51s, and, in some cases, a single C-47 and perhaps an A-26 for utility purposes. However, there was at least one squadron established in 1946 as a light bomber unit and assigned to the New York ANG. In order to receive federal recognition for such a squadron, the National Guard Bureau required a state to provide an organization and personnel to support at least three A-26s, one C-47 and two AT-6s.[109] By 1950 there were eleven light bomber squadrons (see Table below), each equipped with about eighteen B-26s. Besides these, many of the other seventy-two ANG fighter squadrons had one or two B-26s assigned for utility or transport purposes.[110]

ANG B-26 Light Bomber Units

Unit	Location	Model
102nd BS (Light)	New York	B-26
103rd BS (Light)	Pennsylvania	B-26
106th TRS	Alabama	RB-26
108th BS (Light)	Illinois	B-26
112th BS (Light)	Ohio	B-26
114th BS (Light)	New York	B-26
115th BS (Light)	California	B-26
117th BS (Light)	Pennsylvania	B-26
122nd BS (Light)	Louisiana	B-26
135th BS (Light)	[unknown]	B-26
168th BS (Light)	Illinois	B-26
180th BS (Light)	Missouri	B-26
183rd TRS	Mississippi	RB-26
184th TRS	Arkansas	RB-26

ANG Invader Units

The *106th BG (Light)* was allocated to the ANG on 24 May 1946, federally recognized on 21 March 1947 and assigned to the New York ANG at Floyd Bennett Field. The unit was mobilized on 1 March 1951 and assigned to the Strategic Air Command (SAC). Three ANG B-26 squadrons were initially assigned to the group: the 102nd (NY ANG), the 114th (NY ANG) and the 135th (possibly Maryland ANG). The group was moved to March AFB, California, after mobilization. Subsequently, it was equipped with B-29s after May 1951 and the group was redesignated as a medium bomb group. It was demobilized in June 1952 and returned to the NY ANG.

The *111th BG (Light)* was allocated to the ANG on 24 May 1946, federally recognized on 20 December 1948 and assigned to the Pennsylvania ANG at the Philadelphia International Airport. It was mobilized on 1 April 1951 and assigned to the SAC. Three ANG B-26 squadrons were initially attached: the 103rd (Pennsylvania ANG), the 117th (Pennsylvania ANG) and the 122nd (Louisiana ANG). The group deployed to Fairchild AFB, Washington, in April 1951, transitioned to RB-29s in August, was demobilized in June 1952 and then returned to the jurisdiction of the Pennsylvania ANG.

The *118th Tactical Reconnaissance Group* was redesignated from the 118th Fighter Group in February 1951. The 118th FG had been allocated to the ANG in May 1946, federally recognized in October 1947 and attached to the Tennessee ANG at Memphis. After being designated as a TRG, the group was mobilized on 1 April 1951, assigned to the Tactical Air Command (TAC) and stationed at Shaw AFB, South Carolina. Three ANG squadrons were attached with one, the 106th TRS (Alabama ANG) equipped with RB-26Cs. The other units (the 185th TRS, Oklahoma ANG and the 155th TRS, Tennessee ANG) were equipped with RF-51s.

The *126th BG (Light)* was allocated to the ANG on 24 May 1946 and federally recognized on 29 June 1947. It was assigned to the Illinois ANG. The group was mobilized in April 1951 at the Chicago O'Hare Airport and assigned to the TAC. Three ANG bomb squadrons were attached to the group: the 108th (Illinois ANG), the 168th (Illinois ANG) and the 180th (Missouri ANG). For a short time after the unit was activated the 115th BG (California ANG) was also attached at Langley AFB, Virginia, where the unit was training. The 126th deployed to France and was attached to Air Forces Europe for training and exercises through 1952. The 126th was transferred back to ANG control on 1 January 1953 and demobilized.

Alabama ANG

The *106th BS (Light)* was organized at Birmingham, Alabama and equipped with B-26s. Redesignated as the 106th TRS, it was re-equipped with RB-26Cs. The unit was mobilized in April 1951 and assigned to the 118th Tactical Reconnaissance Group at Shaw AFB, South Carolina. Demobilized in November 1952, it was equipped with RF-84s after 1957 but maintained several RB-26s in the unit. The 106th became one of the last ANG units to operate B-26s and some pilots were detached and used to train exiled Cuban pilots for the Bay of Pigs enterprise in 1961. Some flew operational sorties during the invasion and four were killed in action: Thomas Ray (pilot), Leo Baker (flight engineer), Riley Sharmburger (pilot) and Wade Gray (flight engineer).

Arkansas ANG

The *184th TRS* was organized at Fort Smith in 1953. The unit flew RB-26Cs until 1956 when they were replaced by RF-80s.

This California ANG B-26B retains gun turrets but has no armament installed. The 115th Bomb Squadron (Light) was based at Van Nuys and assigned to the California ANG. William J. Balogh, Sr., via Dave Menard



California ANG

The *115th BS (Light)* was organized at Van Nuys. Mobilized in April 1951, attached to the 126th BG (Light) and stationed at Langley AFB, Virginia. When the 126th deployed to Europe, the 115th BS evidently remained at Langley. The unit demobilized in November 1952.

Illinois ANG

The *108th BS (Light)* was equipped with B-26s and mobilized in April 1951. It was attached to the 126th BG and stationed at Bordeaux AB and Laon AB in France. The unit demobilized in November 1952. The *168th BS (Light)* was equipped with B-26s. The unit mobilized in April 1951 and was attached to the 126th BG and stationed at the same French bases. The unit was demobilized in January 1953.

Louisiana ANG

The *122nd BS (Light)* was organized at Jackson and equipped with B-26s. It was mobilized in April 1951 and initially attached to the 111th BG (Light) at Fairchild AFB, Washington. It was later stationed at Langley AFB, Virginia. Demobilized in January 1953, the unit remained equipped with B-26s until 1957.

Massachusetts ANG

At least one unit was evidently equipped with A-26s in the early post-war period.

Michigan ANG

The *172nd TRS* was organized at Battle Creek, Michigan, as a night photoreconnaissance unit equipped with RB-26Cs.

Mississippi ANG

The *183rd TRS* was organized in 1953 at Jackson, Mississippi. The unit was equipped with eighteen RB-26Cs, operating them until November 1957 when the unit's mission was changed and it was re-equipped with C-119s.

Missouri ANG

The *180th BS (Light)* was organized at St. Joseph and equipped with B-26s. The unit was mobilized in April 1951, attached to the 126th BG and stationed at Bordeaux and Laon. It was demobilized in January 1953, but operated the B-26s until 1958 when they were replaced by RF-84s.



A B-26C (s/n 44-25204), late of the Illinois ANG at Chanute AFB, Illinois, in January 1956. The inscription *Class 26* on the nose indicates that the aeroplane has been withdrawn from service and was available for transfer to non-flying duty. Note also that the aircraft serial number has been painted out. Dave Menard

New York ANG

The *102nd BS (Light)* was allotted to the New York ANG on 24 May 1946. The unit was equipped with B-26s and based at Floyd Bennett Field. The unit was mobilized in March 1951, then attached to the 106th BG and assigned to the SAC. It transitioned to B-29s at March AFB and was redesignated as a medium bomb squadron. It was returned to state control in June 1952 and re-equipped, once again, with B-26s. The *114th BS (Light)* was organized and assigned to the New York ANG. Mobilized in March 1951, the unit was attached to the 106th BG and assigned to the SAC. It transitioned to B-29s at March AFB and was redesignated as a medium bomb squadron. The unit was returned to state control in June 1952 and re-equipped with B-26s. It was demobilized in December 1952. The B-26s were replaced in 1957 by F-94s.

Ohio ANG

The *112th BS (Light)* was organized in the late 1940s and possibly based at Cleveland. It was mobilized in October 1951 and stationed at Toul-Rosiere AB, in France. The unit was demobilized in July 1952.

Pennsylvania ANG

The *103rd BS (Light)* was organized in May 1946 and federally recognized in May 1948. The unit was equipped with the B-26. It was mobilized in April and attached to the 111th BG (Light) at Fairchild AFB, Washington. The 103rd was re-equipped with F-84s in 1954. The *117th BS (Light)* was also organized and attached to the Pennsylvania ANG. It was mobilized in April 1951 and initially attached to the 111th BG (Light) at Fairchild AFB, Washington. The unit was stationed and Langley AFB, Virginia and demobilized in January 1953.

Tennessee ANG

The *155th Fighter Squadron* was organized in December 1946 and equipped with P-51s at Memphis. Redesignated as the 155th TRS in April 1951, the unit was mobilized for the Korean War. It demobilized in January 1953 and was re-equipped with RB-26Cs at Memphis. The unit operated RB-26s until 1956 when they were replaced by RF-84s.



Early post-war New Mexican ANG A-26C. s/n 43-22647. This view is included to show how, in some cases, the US insignia was replaced by state insignia.

American Naval Use of the Invader

As part of the A-26 production contracts, one A-26B and one A-26C were diverted to the US Navy for evaluation. From the Long Beach production, A-26B s/n 44-34217 was delivered to the Navy as XJD-1 Bureau Number (BuNo) 57990 on 16 March 1945. From Tulsa, A-26C s/n 44-35647 was delivered to the Navy as XJD-1 BuNo 57991 on 21 May 1945. The Navy designation 'J' indicated the assignment of the aircraft to the utility transport role, while 'D' indicated that this design was the first Douglas product accepted by the Navy for that role. The '-1' suffix indicated the first of the series.

The Navy was looking for a new utility aircraft, particularly for target towing, that would provide realistic performance in anti-aircraft training. An evaluation of the two XJD-1s by Navy Utility Squadron Four and the Aerial Tow Target Development Unit found that the Invader provided a performance boost of nearly 100mph (160km/h) over contemporary Navy utility aeroplanes and had sufficient room in the bomb bay for the installation of tow reel equipment. The Navy was sufficiently impressed with the Invader to accept the transfer of a significant number of AAF surplus machines.

Among these were the thirty-three A-26Cs built at Tulsa earmarked via Lend-Lease for the RAF. These aircraft were delivered from Tulsa between February and April 1945 in RAF markings, assigned an RAF serial block between KL692 and KL724 and were part of a cancelled Lend-Lease order of 138 aircraft. Instead of going to Britain, they were instead flown to McClellan Field, California, for short-term storage and then turned over to the Navy at NAF Litchfield Park, Arizona, in August and September 1945. All or most of the other 105 A-26Cs originally earmarked for the RAF also appear to have transferred instead to the Navy, although this is not clear from the records. What is known is that eighty-six aircraft were delivered to the Navy in August and September 1945 and that at least thirty-three and probably all eighty-six came from the original RAF order. All were operated by the Navy as JD-1s. The Navy assigned available bureau numbers to the aircraft, filling in holes left by production cancellations, in a block ranging between 77139 and 77224. This range was between blocks of AAF B-17s transferred to the Navy at about the same time.

Later, an additional block of fifty-two Invaders were delivered to the Navy, but this does not appear to have occurred until much later, in May 1954. These aircraft were assigned the bureau number block between 140326 and 140377. Because the two blocks of eighty-six and fifty-two equal the number of the original RAF aircraft, it is probable that the latter block of A-26s were, in fact, simply stored at NAS Norfolk, Virginia, until accepted for service in 1954.

The two A-26s actually transferred to the RAF in 1945, KL690 and KL691, were returned in early 1947 and almost certainly transferred to the Navy. These received the bureau numbers of 80621 and 80622, respectively. An additional ten surplus A-26Cs were transferred in April 1949, being assigned a serial block between 89072 and 89081. Thus a total of 152 A-26Cs were transferred to the Navy for post-war use. A tie-up between the AAF serial numbers, the RAF numbers, and the USN bureau numbers has yet to be established.

Modifications to the basic Invader included the installation of Navy Mark VIII target reels with the Mark I hydraulic



The Navy operated the B-26 as the JD-1, primarily for target towing and utility duties. This JD-1 carried the Bureau Number of 77181 and was assigned to Utility Squadron (VU) Six. D.H. Brazelton via Dave Menard

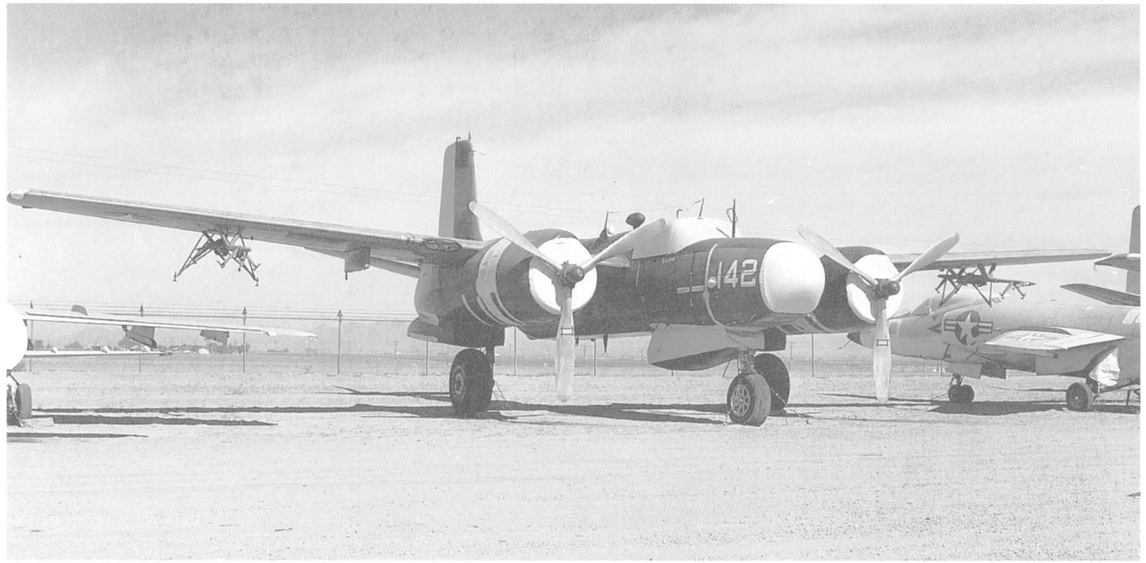


power system supplied by a self-contained hydraulic pump. The two reels permitted high-altitude, anti-aircraft training through their large tow cable capability (12,000ft [3,700m] of ⅛in [3.2mm] cable for each reel) and would provide for rapid target exchange with the availability of a standby reel. The prototype modification was done at NAF Litchfield Park by the Goodyear Aircraft Corp. Other changes included the installation of additional radios and an AN/AP-3 radar unit for night and restricted visibility missions. In some aircraft radar countermeasure equipment was also installed. Most of the production-line conversion work to change the standard A-26 to the JD-1 was done at NAS Norfolk, Virginia.

The Navy JD-1 became the UB-26J or the DB-26J after 1962 when the US military aircraft designation system was standardized. This UB-26J was assigned to Utility Squadron (VU) Eight and wears a colourful scheme of yellow wings and blue fuselage. Boeing Historical Archives

Initially, the aircraft were operated in their original RAF colours, no doubt causing confusion with RAF and USN serials being displayed. However, they were soon repainted in the standard Navy colour scheme of the time, consisting of overall semi-gloss sea blue shade and assigned to utility squadrons. For target towing, a typical mission utilized 18ft (5.5m) sleeved targets towed from either reel. At the speed of 240kt (440km/h), the targets trailed 6,500ft (2,000m) behind and 1,000ft (300m) lower than with the JD-1. During their employment the JD-1 equipped at least six utility squadrons, including VU-5 and VU-10.

One significant early use of the JD-1 by the Navy was on 30 October 1946, when a specially modified aircraft was used as a





Above: **The Navy retired any remaining active B-26Js to NAF Litchfield Park, Arizona, in the mid-1960s. All were either scrapped there or moved to Davis-Monthan AFB (when NAF Litchfield Park closed) in 1966 and then scrapped. This view shows drone controller JD-1D BuNo 77142 at Litchfield Park in March 1961.** Brian Baker

Left: **The last active B-26 operated by the US military was this VB-26B assigned to the National Guard Bureau at Andrews AFB, shown here just before retirement and transfer to the National Air and Space Museum in October 1972. One additional, though not operational, B-26 remained in the inventory until November 1973.** S.H. Miller via Dave Menard

platform for the Navy's first test of an ejection seat carrying a live crew man. The test series was conducted from NAMC Philadelphia, Pennsylvania, with the aircraft flying at 250kt (460km/h), 6,000ft (1,800m) over Lakehurst, New Jersey.

In 1962, when the tri-service aircraft designation system was implemented, the JD-1 became the UB-26J in Navy service. A few JD-1D drone controllers became DB-26Js under the new system. By the early 1960s most Invaders had been withdrawn from active squadrons, though a few remained until about 1965. Retired aircraft were stored at the Navy storage yard at NAF Litchfield Park, Arizona. Apparently most, if not all, of the surviving Navy JD-1s were subsequently scrapped at Litchfield Park or, later, at Davis-Monthan AFB, Arizona. There is no record of any Navy surplus JD-1 moving to the civil register, being exported or transferred to another user.

CHAPTER SEVEN

Korean War Service

If the Invader was a late arrival to the combat theatres of World War II, it also became one of the most significant weapons employed by the United States Air Force (USAF) in the Korean War. Admittedly, this was primarily because it was the only available USAF aircraft that had the potential to perform the much needed mission of night interdiction during the war. However, after a tumultuous start, the B-26 and its crews settled into an effective role in the night skies over Korea. Indeed, their exploits in the Korean War serve as the benchmark for the long and distinguished history of the B-26 Invader.

As for the involvement of the B-26 in Korea, there were actually only three bomb groups that flew the Invader in offensive operations during the conflict and two of those were essentially the same unit. The 3rd Bomb Group (BG), part of the occupation forces based in Japan, was an understrength group with just two bomb squadrons in June 1950. Shortly after the war started the USAF mobilized a reserve unit, the 452nd BG (Light) from Long Beach, California and deployed it for Korean action by October. The 452nd was supplanted by the 17th BG (Light) in May 1952 but, in the event, the personnel, equipment and aircraft of the 452nd were simply reformed as the new group. Throughout the war both groups were operated understrength. On paper, a light bomb group was authorized for three squadrons of twenty-four aircraft each, for a total of seventy-two. It was not until early 1952 that the 3rd BG was authorized for its full complement and the 452nd BG was never authorized for more than three squadrons of sixteen aircraft each. At its peak, the Fifth Air Force had 120 operational B-26s with sixty airframes held in reserve to replace losses.

War Starts

At the conclusion of World War II the Korean peninsula was partitioned across the 38th Parallel, in accordance with an agreement made at the Potsdam Conference, with the United States occupying the southern half and the Soviet Union the northern. This was supposedly only an effort to facilitate the surrender of the Japanese forces but, as the Cold War ignited, it solidified into a border between rival regimes. The United Nations organized elections, held in May 1948, that established the Republic of Korea, while the Soviets organized the People's Democratic Republic of Korea to the north. The United States was eager to withdraw its forces from the peninsula and worked to organize a modest South Korean army for self-defence. By June 1949 the remainder of the American military forces had been withdrawn, leaving only military advisers, diplomats and their dependents. Though never overtly stated, the implication was that Korea lay beyond the defensive perimeter of American interests in the Far East.

On 25 June 1950 North Korean forces burst across the border and drove south in a startling attempt to secure the entire peninsula in the name of Communism. Any shaky efforts to settle the Korean question peacefully that existed after the defeat of the Japanese collapsed. North Korean troops struck a quick blow to seize South Korea and push its few American supporters off the peninsula. There was little to stop the southward drive. The South Korean army was woefully inadequate and the small group of American personnel, primarily military advisers, were ill-prepared to resist and both retreated in disarray.

The Far East Air Forces (FEAF), headquartered in Tokyo, were the



The war in Korea brought a dramatic increase in the demand for B-26s. Overhaul lines at the Sacramento Air Depot (McClellan AFB) and the Ogden Air Depot (Hill AFB) were put in place to help to ease the shortage of available aircraft. This view shows the line at Hill AFB working on B-26s and B-29s for the war effort. The first B-26B in this view, s/n 44-34562, is equipped with a SHORAN antenna in place of the top turret. It was lost in action with the 452nd BW on 28 February 1952. Hill AFB History Office

remnants of the massive air force that had helped defeat Japan five years earlier. Commanded by Lt Gen George E. Stratemeyer, the FEAF had as a primary mission the defence of Japan, the Marianas, the Ryukyus and American bases in the Philippines. The largest component of the FEAF was the Fifth Air Force, headquartered at Nagoya, Japan and commanded by Maj Gen Earle E. Partridge. The Fifth's mission was to provide the air defence of Japan. Five fighter and reconnaissance groups were assigned, primarily equipped with F-80s and F-82s. The bomber component, based at Johnson AB near Tokyo, was the understrength 3rd BG, part of the 3rd Bomb Wing (BW), also based at Johnson AB. As of 25 June 1950, the group had two squadrons attached, the 8th and the 13th Bombardment Squadrons (BS), with a total of just twenty-six operational aircraft. The 8th BS was, fortuitously, already deployed to Ashiya AB, Itazuki in Japan, with ten B-26s when the war started.[111] Itazuki was half the distance to Seoul, less than 400 miles (640km), when compared to the distance to Johnson AB. Two days after the invasion the 13th BS also deployed to Ashiya AB. The 8th, meanwhile, flew top cover sorties to provide aerial protection for the sea evacuation of dependents and other Americans from South Korea to Japan.

On 28 June the 8th BS flew the first USAF operational mission of the Korean War by staging through Iwakuni AB, on the west coast of Japan, to bomb rail yards at Munsan in South Korea with twelve B-26s. Later the same day, the 13th BS conducted an attack against the same target. Bad weather prevented further attacks until 29 June, when two additional raids were conducted against North Korean forces in South Korea, with the loss of one B-26. Raids using 19th BG B-29s, staging through Kadena AB, Okinawa, also began against North Korean forces.

On 30 June President Truman authorized attacks against targets in North Korea and the first raid was launched with sixteen B-26s of the 8th and the 13th Bomb Squadrons against the air base at Pyongyang. At the same time, the headquarters of FEAF requested a substantial increase in the number of aircraft to support the deteriorating situation, including the provision of twenty-two additional B-26s to bring the two squadrons of the 3rd BG to the authorized levels. Unfortunately for the FEAF, there were few B-26s or aircrews immediately available for deployment and it had to conduct operations with what was on hand when the war started.

On 1 July the 3rd BG was detached from the 3rd BW and deployed to Iwakuni AB. Wing headquarters remained at Johnson AB and the group was placed under the operational control of Fifth Air Force headquarters. It immediately began daytime operations against targets in North Korea. Wing headquarters did not move to Iwakuni AB until 1 December, when it resumed control of the bomb group.



Besides providing additional aircraft, the overhaul lines also worked to standardize the B-26s to ease maintenance and operational workloads. However, due to the shortages of aircraft and time, such efforts met with only limited success. At one point, the USAF identified nearly two dozen configurations of B-26s in the inventory. National Archives



Colonel Brady's Dixie Special **(s/n 44-34737) was the primary aircraft assigned to Col Henry Brady while he was commander of the 3rd BG in 1951.**
Elmer D. Howk via John Horne

A typical load carried by some of the Fifth Air Force Invaders. This view shows a 110gal (416ltr) napalm tank with a phosphorus grenade attached to help ignition, two 5in HVAR and two 5in ATAR rockets hung on the under-wing racks.
Walt Sheehan via John Horne



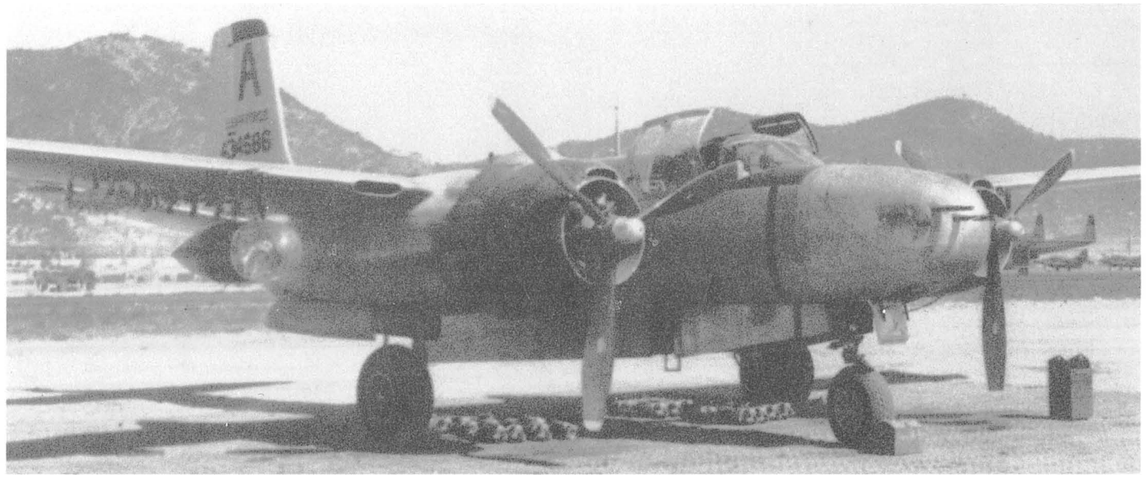
In July representatives from the USAF chief of staff visited FEAF headquarters and agreed that additional resources were quickly needed. It was decided to activate a reserve unit and provide two additional bomb squadrons for assignment to the 3rd BG.

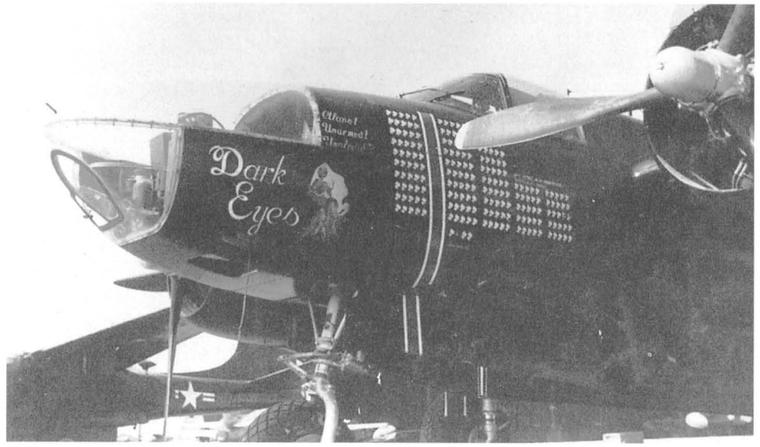
On 7 July the USAF ordered the 162nd Tactical Reconnaissance Squadron (Night Photographic), equipped with RB-26s and based at Langley AFB, Virginia, to deploy to Itazuke AB for attachment to the 543rd Tactical Support Group. Squadron crews flew their RB-26s to Hill AFB to allow the Ogden Air Depot to install a new type of flash cartridge illumination system on their aircraft for night photography. After installation, it was decided that the systems were too heavy to be ferried installed on the aircraft and so the equipment was removed and shipped separately. The RB-26s proceeded to Itazuke AB, but the illumination systems did not arrive until late August, delaying the operational status of the unit. The unit's ground echelon also arrived in late August. On 8 October the unit was moved to Taegu AB (K-2), South Korea, the first B-26s actually based on the peninsula.

Also on 7 July the 452nd BW (Light), the reserve unit based at Long Beach, was called to active duty, effective from 10 August. The combat component of the wing was the 452nd BG. The group had originally been established in June 1943 and, equipped with B-17s, was assigned to the Eighth Air Force in England during World War II. It was returned to the USA in June 1945 and deactivated two months later. It was reactivated as a reserve unit in April 1947, but was not assigned aircraft until 1949.

Once mobilized, flight crews were assigned a two-months' intensive B-26 training programme at George AFB, near Victorville, California. The Bomb Group consisted of four squadrons, the 728th, the 729th, the 730th and the 731st. The last was trained as a night intruder unit; the others as light day bomber units. On 15 October 1950 air components of the wing began deploying westward toward Itazuke AB. B-26s equipped with long-range 675gal (2,550ltr) bomb bay ferry tanks were flown to Japan via Hawaii, Johnson Island, Kwajalin Island and Guam, shepherded along the way by B-29 mother ships to provide navigation.

An AVQ-2 searchlight-equipped B-26B, s/n 44-34686, assigned to the 729th BS of the 452nd BG. The searchlight could be controlled by a panel installed on the right side of the cockpit.
Elmer D. Howk via John Horne





A veteran of 198 missions is the 12th TRS's RB-26C s/n 44-35671, *Dark Eyes*. Don Evans via John Horne

Upon arrival, the 731st BS was detached from the wing and assigned to the 3rd BG, already conducting night interdiction raids in North Korea. Upon assignment, the 731st Squadron assumed the majority of the night interdiction missions flown by the 3rd BG until June 1951, when the other two squadrons were fully utilized for the night-time attacks.

The shift of the 731st Squadron brought the strength of both groups to three squadrons. The 452nd BW, meanwhile, flew its first combat mission on 27 October 1950, just seventy-seven days after being called to active duty. The ground echelon arrived at Itazuke AB beginning in mid-November.

Thus, by 1 November, B-26 deployment with the FEAF consisted of the 3rd BG at Iwakuni AB with the 8th, the 13th and the 731st Bomb Squadrons; the 452nd BW at Itazuki AB with the 729th, the 730th and the 730th Bomb Squadrons; and the 162nd Tactical Reconnaissance Squadron with RB-26s at Taegu AB, Korea.

During the first three months of the war, however, the FEAF light bomber load was carried by the 3rd BG. In July the group flew nearly 700 sorties and claimed the destruction of forty-two tanks and thirty-nine locomotives, and 5,000 enemy soldiers killed or wounded. Some of these missions were occasionally flown at night, but in August the group, particularly the 731st BS, began regular night interdiction missions against North Korean convoys supplying troops in South Korea. Most of the day attacks were left to the FEAF and US Navy fighter-bombers.

The group's aircraft, consisting primarily of hard-nosed B-26Bs, were painted overall black, but were otherwise not modified for the new role. The B-26s assumed the night interdiction mission because the USAF had no other suitable aircraft and any tactics to be employed had to be developed locally. Operational experiments were conducted to make the night missions more successful. Initially, AN/M-26 paraflares were dropped by the B-26s in an attempt to illuminate targets. However, 50 per cent of the flares did not ignite, frustrating the effort. Later, the 3rd BG tried dropping Navy Mk VIII flares from C-47s, each of which could provide 5 minutes of illumination. Flare shortages, however, prevented further application of that tactic. Through the fall of 1950, the group's best efforts succeeded only in harassing the North Koreans' supply lines.

The Chinese Enter

Through August and into September, the North Koreans pushed the South Korean and United Nations defenders into a smaller and smaller area at the southern end of the peninsula near the major harbour city of Pusan. Known as the Pusan perimeter campaign, the situation became desperate for the defending forces. However, beginning on 15 September, Gen Douglas MacArthur successfully achieved the brilliant landings at Inchon and his troops drove eastward across the peninsula threatening to cut off the North Koreans, thus reversing the tide of the war. Suddenly the North Koreans were in a headlong retreat with United Nations forces pursuing them across the 38th

Robert Olds's *Olds 88*, s/n 44-34563, belonging to the 729BS, 452nd BG. Olds had vowed to resign if he had to fly more than eighty-eight missions. The aircraft was lost on 7 May 1952, when it crashed at sea after an attack at Wonsan. Charles Cohen via John Horne



Parallel. Within eight weeks of the landings at Inchon the United Nations troops were driving toward the Yalu River and an early end to the war was expected, with complete victory.

Early warning signs from the People's Republic of China aside, the fortunes of war turned again when, on 25 November, the Communist Chinese army poured across the Yalu and surprised the United Nations armies on the northern edge of the peninsula. Soon the United Nations forces were again in retreat and it became apparent that the war would not end soon.

Before the Chinese ground troops joined the war, preparations were under way to move both light bomber groups to airfields being built or rebuilt in Korea. However, the unstable combat situation deferred the movement of the groups and they continued to operate out of Japanese bases, staging into Korea for their missions.

Despite the rapidly changing situation, the 3rd BG continued its night attacks against North Korean targets. Authorized sixty-four aircraft for its three squadrons, the group never had that many B-26s on hand in 1951. Through the spring of 1951 the Fifth Air Force headquarters expected the group to fly thirty-eight combat sorties a night. Though the group was based in Japan, it had to stage its missions through Taegu AB in Korea, where crews would sometimes fly two sorties a night. The Taegu airfield caused additional problems because fuel, bombs and other supplies were often in short supply. Furthermore, the pierced steel matting that stabilized the runway was shredding the tyres on the B-26s and stocks of them were limited.

The attacks were conducted as ground-radar controlled strikes against fixed targets, ground-support missions, or night interdiction missions against North Korean convoys. With the earlier success of C-47s carrying flares, the 3rd BG modified six C-47s and created a Tactical Flight Section to operate the aircraft. Dubbed as *Fireflies*, the 3rd Group retained these aircraft at Taegu until May 1951 when they were transferred to the recently activated 67th Tactical Reconnaissance Wing. However, even before they were transferred, there was concern about the slow and vulnerable C-47s being flown deep into North Korea and they were restricted from flying north of the 38 degree, 30 min Parallel. Racks were added to the under-wing hardpoints on the B-26 to allow Navy Mk VIII flares to be carried, but many of these also proved to be faulty.

SHORAN

Short-Range Navigation (SHORAN) was an early radio-navigation aid adapted to allow a measure of precision bombing at night or in poor weather conditions. SHORAN was developed by the AAF during World War II for the European theatre but was not widely used before the war ended. In Korea a limited number of B-26s and B-29s were equipped with SHORAN and they were utilized extensively through the war.

SHORAN worked on the principal of timing radio pulses sent from a unit that alternately transmitted and received both low- and high-frequency signals. Two ground stations, whose geographic positions were plotted, were interrogated by the airborne unit and sent corresponding pulses back to the aircraft receiver. Based upon the timing of the pulsed signals, a geographic position could be calculated. The AN/CPN-2 ground stations were set up and maintained by special maintenance units. One station transmitted a low-frequency signal and the other a high-frequency signal and the B-26 flew a constant distance arc off one of the stations until it reached a calculated distance from the other, at which point the bombs were dropped.

SHORAN had a maximum range of 300 statute miles (480km) and required line-of-sight with the ground stations. The line-of sight requirement dictated that the bombing altitude was usually above 14,000ft (430m), high for a heavily-loaded B-26 and requiring high engine power-settings and excessive fuel consumption. No more than twenty aircraft could interrogate the ground stations at any one time. Precise navigational parameters were developed during the mission pre-planning and they had to followed exactly by the crew to ensure accurate bombing. For the pilot, this meant flying an exact altitude and airspeed through the bomb run. The geometry of the system was such that four approaches to the target were possible and each was calculated and evaluated in the mission planning. The one route that offered the fewest anti-aircraft defences and the best tactical advantage was selected as the primary route, with the others used for back-up. Missions were flown single ship, sometimes in a trailing line with several other SHORAN-equipped aircraft. Accuracy under ideal circumstances was predicted at an on-line course plus or minus 300ft (90m) laterally.

For the B-26, the SHORAN modifications required that the upper and the lower turret and their associated equipment be removed. The lower turret opening was faired over, while the SHORAN transmitter was installed in the position of the former upper turret. A large dome, notably higher in profile than the conventional turret, covered the transmitter and distinguished the SHORAN-equipped B-26 from the standard aircraft. The gunner's compartment was very tight once the SHORAN equipment was installed. The SHORAN navigator-bombardier entered the compartment through the right-side access door, but, due to the limited space, the crew seat had to be removed for him to get into the compartment. The usual process was for the operator to stand on a ladder, remove the seat to the aircraft exterior, load his parachute and other equipment, climb into the compartment and have the seat handed back to him. The AN/APN-3 SHORAN receiver and console was installed on the left side of the compartment and, with the operator seated facing forward, was operated over his left shoulder. Also installed on the left side of the compartment was the K-1A bombing computer that was used in conjunction with the SHORAN unit. Emergency egress required that the hatch and seat be jettisoned before the operator could escape.

Night Interdiction

With the successful daytime attacks on North Korean supply convoys in early 1951, the North Koreans and the Chinese increasingly attempted to support their war effort at night. Night interdiction was frustrated by weather, terrain and an inability to identify targets. Despite the best efforts of the B-26 crews, long convoys of trucks and supply trains continued to feed the Communist war effort. Attacks continued, however, and tactics were developed to suit the situation.

On moonless nights, the trucks had to use their headlights, making it possible to pick them out; however, virtually no other targets could be identified by the B-26 pilots. On moonlit nights the trucks often ran dark, making them difficult to locate. Trains, however, could be spotted, even running without lights, as they sped along open track from tunnel to tunnel. However, it became difficult for flight crews to assess the effects of their attacks accurately because so little could be identified. The Fifth Air Force established specific criteria for claims made against trucks or trains. A truck had to be seen to explode or burn violently to be claimed, while railway equipment had to been seen to explode, burn intensely or be derailed in a location that precluded recovery. The flight crews, though, could rarely be so specific in identifying such destruction, so they took their best estimate. Later daytime reconnaissance often revealed little as the Communists appeared to reclaim much damaged or destroyed *matériel* before dawn.



***Hells Belle* of the 728th BS in the hangar at Miho, Japan, where the 452nd BG had established a maintenance base.** Amos Saulsbury via John Horne

None the less, the B-26 attacks continued even if the tacticians could not verify the results. The B-26s were the only USAF aircarft on station that were performing the night mission with any effectiveness. Marine Corps pilots, using F4U Corsairs and, later, F7F Tigercats, were also carrying out night interdiction missions but on a smaller scale and with less apparent success. Their missions, flown from Pusan West AB (K-1) in south-eastern Korea, often provided more direct support to ground forces and were made by *Firefly* C-47s assisting with flares.

The 3rd BG planned their missions to depart from their staging base at Taegu to put B-26s over the North Korean targets shortly after dusk. On moonless nights the crews searched for tell-tale headlights from altitudes well above the known terrain, usually from 3,000 to 4,000ft (920 to 1,200m) in the western half of Korea and from 5,000 to 6,000ft (1,530 to 1,830m) in the mountainous areas to the east. For these night attacks the bomber-nosed B-26Cs were the better suited because the bombardier had much better visibility for visual searches than the pilot, with his view restricted by the nose and engine nacelles. Also, most B-26Cs were equipped with the Norden bombsight which, in the hands of a skilled bombardier, proved relatively effective in tracking and hitting targets once identified. Even after truck drivers had shut their lights off, the bombardier was often able to retain a fix on a truck positions based upon the view presented in the bombsight. The 3rd BG had requested additional B-26Cs, or at least B-26C noses for their B-26Bs, but supplies were limited and long in coming. For those crews with B-26Cs, they preferred to operate without flares and often dropped 100lb (45kg) M-47 fire bombs or 260lb (120kg) M-81 fragmentation bombs.



Daylight low-level attack was not for the faint-hearted. After losing a good part of their left elevator and aileron to anti-aircraft fire, the crew of the this 730th BS B-26B nursed it back to Miho, Japan, for a safe landing in early 1951. This aeroplane, s/n 44-36925, was later lost on 25 July 1952, during a night attack over Korea. Charles Cohen via John Horne

Crews operating with the B-26Bs developed strafing tactics and preferred to have flares available. Once targets were identified, the bombers would manoeuvre to allow long strafing runs that began as high as 6,000ft (1,830m) in mountainous areas, ending at a height of about 1,500ft (460m). Obviously, the success of these attacks depended upon the pilot's familiarity with the terrain, confidence in his charts and personal desire to drive an attack into the darkness. With flares, pilots could press their B-26s down to the lowest level, sometimes as low as 200ft (60m) and make very accurate attacks. In April 1951 the 3rd BG recorded claims of sixteen locomotives and 227 vehicles destroyed, and the following month, five locomotives and 629 vehicles were claimed. Again, it was often difficult to accurately assess the effectiveness of the attacks, but the crews and the Fifth Air Force felt that they were enjoying a measure of success.

The 452nd Group, since its deployment in October 1950, had primarily conducted daytime interdiction and close-air support attacks. Late in the year the group had moved from Itazuki AB to Miho AB, also in Japan. Through the spring of 1951 the three squadrons of the group provided the only daytime light bomber operations for the Fifth Air Force. In February 1951 the FEAF made a request to USAF headquarters that the authorized levels of each squadron of the group be increased to twenty-four aircraft. The USAF denied the request primarily due to crew shortages, but also because insufficient



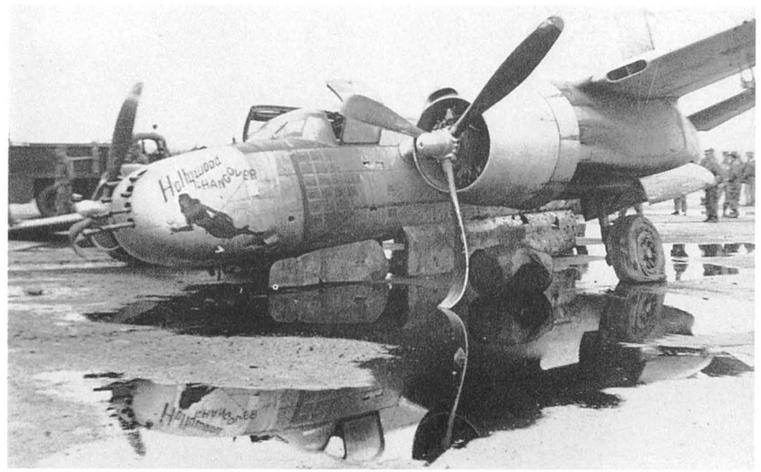
This 730th BS B-26B, s/n 44-34698 and carrying the name *Miss Used*, sits on the ramp at Miho in April 1951 after narrowly escaping disaster. A 20mm cannon shell hit the nose beneath the weapons bay and passed through the aircraft without exploding. At this point it shows sixty missions to its credit. The aircraft was lost on the night of 8 August 1952, with the last report from the crew indicating that they were bailing out. Boardman C. Reed via John Horne

B-26 stocks were available. By May the toll on men and equipment was apparent, as 37 per cent of the original aircraft had been lost and one squadron, the 729th, had only eight operational B-26s. Planned rotation of flight crews at forty missions had to be delayed to continue bomb group operations since the supply of replacement crews and aircraft was still at a trickle.

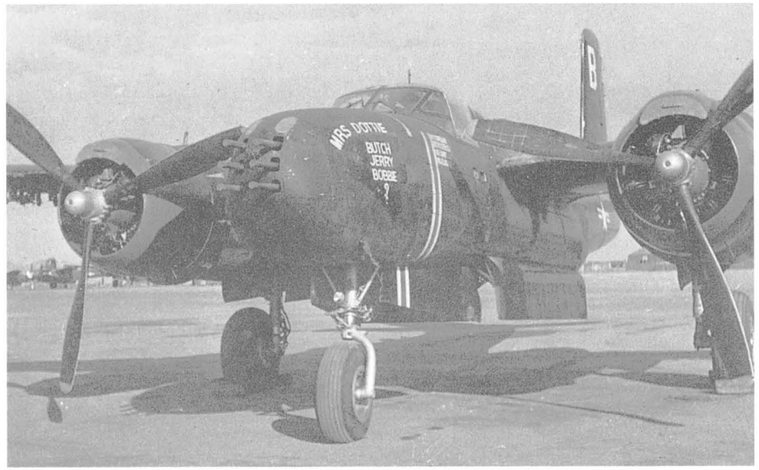
On 23 May the 452nd Wing moved to Pusan East AB (K-9) in south-eastern Korea to bring the aircraft closer to the targets. Indicating the importance and perceived success the FEAF had given to the night interdiction mission of the 3rd BG's B-26s, the 452nd BW was reassigned to the night interdiction mission beginning in mid-June.

Also in June the 3rd BG's 731st BS was deactivated. Its equipment and personnel were assigned to the reactivated 90th BS (Light) and permanently assigned to the 3rd BG. In August the 3rd BG moved from Iwakuni AB to Kusan AB (K-8) in south-western Korea. At that time Korea was roughly divided by a north–south line, with interdiction responsibility for the western half assigned to the 3rd BG and the eastern half to the 452nd BG.

Both Pusan East AB (K-9) and Kusan AB (K-8) were old Japanese bases renovated by special US Army units. The Army units, designated as Special Category Army Personnel with the Air Force (SCARWAF), faced major reconstruction projects on numerous airfields throughout Korea in an effort to support the growing USAF presence. The runways and taxiways had to be



***Hollywood Hangover*, s/n 44-34553, of the 728th BS after a dramatic landing at Kimpo (K-14) in 1951. Note the combat damage to the bomb bay and aft belly. Apparently the flaps were inoperable since they remain retracted.** Jack White via John Horne



An eight-gun B-26B, s/n 44-34371, with only six guns installed, as seen at Kusan AB in late 1952. Note that the two upper gun ports are faired over. This is *Mrs Dottie*, believed to have been operated by Lt Herbett Covell, the 13th BS top locomotive ace, with eighteen destroyed or damaged. Lou Morales via John Horne

repaired and strengthened, old buildings refurbished, new buildings erected and facilities provided to support several combat units at each of the fields.

With both B-26 groups now based in Korea, efforts intensified to achieve verifiable results from the night interdiction missions. Both groups modified several B-26s to carry full bomb bays of fifty-two paraflares each. The 3rd BG chose to fly paired missions of B-26s with mixed loads of bombs and flares, with each aircraft assisting the other during attacks. For the 452nd BG, the preferred tactic became lone-wolf patrols of single B-26s equipped with flares and bombs. The two groups developed a friendly competition for truck and train claims. In July 1951 the 3rd Group laid claim to 240 trucks destroyed with another 693 damaged. The 452nd claimed 471 trucks destroyed and 880 damaged. Attempts to verify any of the claims, however, continued to prove elusive.

Both B-26 groups suffered from low aircraft in-service rates due to combat damage and maintenance requirements. In July 1951 the 452nd BG recorded a ready rate of only 57 per cent. However, drawing upon the experiences of a fighter-bomber group based at Taegu, the 452nd Wing established a Rear Echelon Maintenance Combined Operation (REMCO) at Miho AB in southern Japan. The REMCO was under the command of the wing's Maintenance and Supply Group and the local control expedited depot-level maintenance on the B-26s. Invaders were shuttled through Miho for major damage repairs, technical order compliance, major inspections and modifications. By November the in-service rate had improved to 82 per cent.

The 3rd BG, meanwhile, had moved its maintenance base from Iwakuni to Kusan with the group in August and saw its ready rate drop from 78 per cent in July 1951 to 65 in December. The 3rd BG recognized the success of the 452nd model and likewise established a REMCO at Miho.

Getting a new nose tyre on the ramp at Iwakuni AB in early 1951 is the 731st BS, 3rd BG B-26B s/n 44-35966 carrying black panther nose art. Note the 165gal (625ltr) under-wing fuel tanks. Chester Blunk via John Horne



Logistic Problems

The general availability of B-26 airframes continued to be a problem for both Wings. When the Korean War began in June 1950 there were approximately 350 B-26s in the active USAF inventory, with another 150 or so assigned to Air National Guard squadrons. The USAF held in storage another 328 B-26s at the Ogden Air Depot, plus others at the Sacramento Air Depot and in the storage facility at Pyote, Texas.

In July the Air Materiel Command (AMC) initiated Project *Hold-Off*, the general effort made to support the war effort by modifying and reconditioning aircraft needed by the FEAF. Though the project encompassed a wide variety of aircraft, it specifically called for B-26s, B-29s and F-51s to be removed from storage and added to the active inventory. Most of the work was accomplished by the AMC depots, though some was performed by contractors under the direction of the AMC.[112]

Project *Hold-Off* was implemented with the intention to withdraw 150 B-26s from storage at Ogden, but this was increased to 250 in August 1950. Douglas Aircraft was awarded a contract to recondition 147 of the B-26s, while the Ogden Air Depot set up a production line for the remaining 103. Of those prepared by Ogden, fifty-six were specified for modifications to the RB-26 configuration while thirty would be equipped with SHORAN navigation receivers.[113]

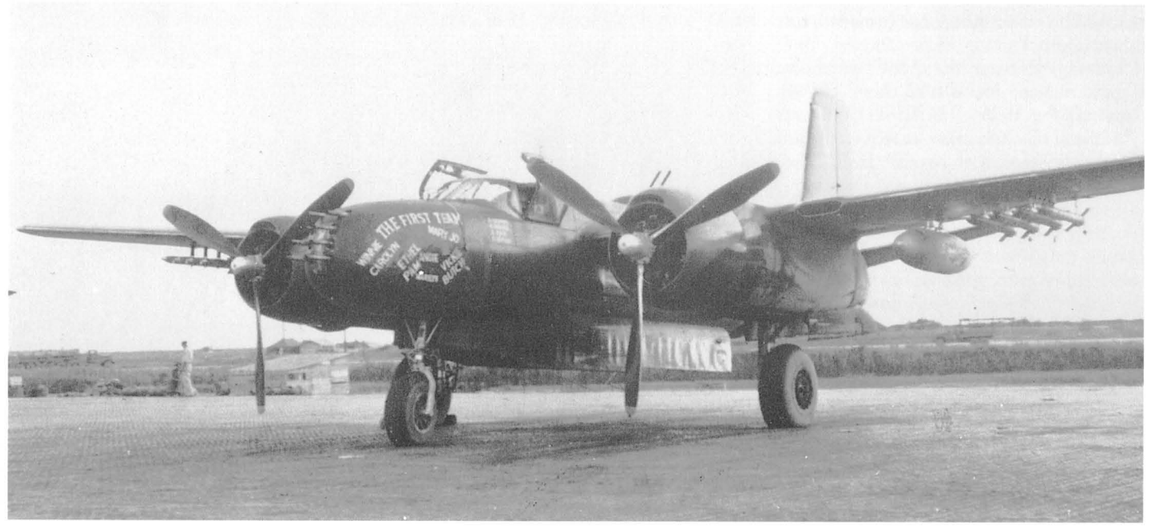
By November Douglas had reconditioned 150 B-26s (three more than specified) and the first of these were assigned to the 452nd BG as it prepared to deploy to Korea. The other aircraft were channelled into the flow of replacement aircraft demanded by the operational attrition rate. In the same month the AMC reported that a total of 143 B-26s and RB-26s were in the process of being reconditioned by AMA depots at Ogden, Sacramento and elsewhere.

The sudden demand for B-26 parts to perform the reconditioning work caught the AMC short. As early as August 1950 the Ogden depot was reporting critical shortages. Accordingly, the AMC



The 8th BS operated *Torchy*, a high-time B-26B which, when this photograph was taken, had already chalked up 205 missions. Elmer Howk via John Horne

Bombed up, armed and ready to go is the 13th BS B-26B *The First Team* at Pusan in early 1952. This was the primary aircraft of Capt Donald Soefkler. Charles Hinton via John Horne





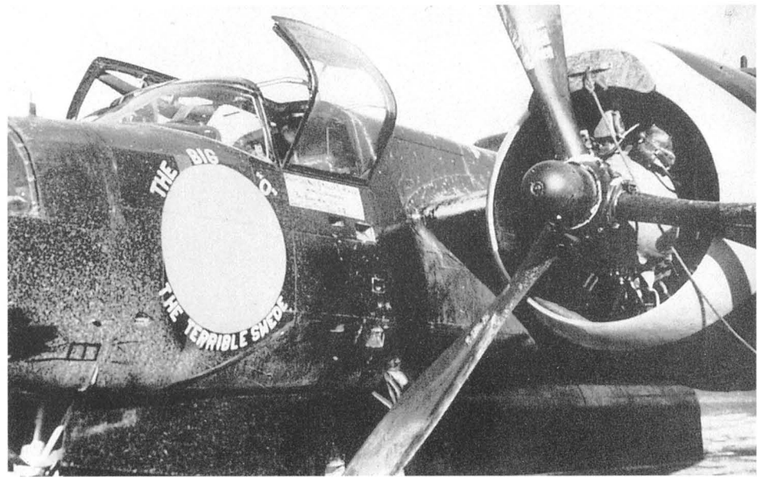
In late 1952 the 3rd BG was assigned a trio of modified B-26Cs that carried infra-red detection equipment in the nose compartment to assist in locating night-time targets in Korea. *We Go Pogo* (s/n 44-34153) was one of the three, shown here with canvas covering part of the secret equipment but with the creator of the artwork, T/Sgt James Lamson, clearly beaming.
Donald Mansfield via John Horne

authorized the reclamation of thirty-nine B-26 airframes at Pyote, twenty-eight at Sacramento and a hundred at Ogden to provide spares support for the depots and Douglas. High-time and older B-26s were initially selected for reclamation, but eventually a substantial number of all B-26s held in long-term storage were dismantled for parts. These were cleaned, tested, tagged and sent to the overhaul line. The reclamation workers salvaged or stored the remaining components for future use.[114]

Through the war the AMC was busy trying to meet FEAF and other USAF demands for B-26s. In April 1951 ten additional B-26s were removed from storage at Ogden, with another twelve the following year. Some of these aircraft were diverted from the FEAF to support other USAF activities. The entire B-26 depot output for August and September 1951 was used to equip the 126th BG being prepared for deployment to Europe.

Most of the depot work fell to the Ogden AMA depot at Hill AFB. One of the first assignments was the development and installation of night photoreconnaissance equipment in the 162nd TRS RB-26s flown in from Langley AFB en route to Korea. Much of the equipment had already been worked out before to the outbreak of hostilities but installation engineering was still required. Maintenance crews installed a .50 calibre type A-3 photoflash cartridge in the front right-hand bomb bay of each of the sixteen RB-26s assigned to the 162nd TRS. K-19 cameras were arranged in a split vertical manner, each fitted with a type A-14 image-calibration magazine. A control system was designed and installed to allow operation of the system by a single master control. The system allowed the ejection of a photoflash cartridge during a low-altitude run, providing usable photographic reconnaissance. USAF pilots at Hill tested the system using the old Union Pacific railway tracks that skirted around the north end of the Great Salt Lake as they headed for Promontory Point. The sixteen RB-26s were modified between 15 July and 2 August 1950. As noted earlier, some of the equipment was removed for the ferry flight and reinstalled when the aircraft arrived in Korea.[115]

In November 1950 a second overhaul line was implemented at the Ogden Air Depot to double the output. Airframes subject to overhaul were not just aircraft coming off the storage yards. Operational aircraft were all sent through the lines to standardize and modify those destined for the FEAF. Modifications included the installation of water injections systems, turrets, guns and ferry tanks.[116]



The commanding officer of the 3rd BG, Col Nils Ohman, used B-26C s/n 44-34098 as his primary aircraft, thus the name *The Big 'O', The Terrible Swede* carried on the nose.
Hans Petterman via John Horne

The 452nd BG at Pusan in May 1952, a reserve unit, was deactivated, but the aircraft and personnel were transferred to the reactivated 17th BG. The 34th BS was assigned to the new group and was operating this B-26C, *No Sweat*, a few months later.
Ernie Hendricks via John Horne

Standardization of B-26s became a pressing issue for the FEAF. B-26s in the theatre included those with two turrets, those with only an upper turret, those with eight-gun noses, those with six-gun noses, those with internal wing guns, those with gun pods below the wings, available hard points and wide variations of electronic equipment installations.[117] Besides being a nightmare of maintenance support for the varying airframes, there were combat concerns also for pilots flying in pitch-black conditions trying to operate controls located in different places on different aeroplanes. Pilots often had to use flashlights to find switches, not an ideal situation for night operations. Maintenance personnel identified twenty-two variations of manual and electric controls in FEAF B-26s.[118] Before the aircraft were accepted from the AMC depots, the Fifth Air Force headquarters requested forty specific modifications to prepare B-26s for the night intruder mission.[119] However, equipment shortages and depot delays did not always allow the luxury of having standardized machines.





This B-26B was operated by the 13th BS, 3rd BG while assigned to Iwakuni AB in late 1950. *Big Chief* was s/n 44-34221 and was later assigned to the 8th BS, where it was lost on 21 May 1951, after being hit by ground fire. It crashed 30miles (48km) north-west of a bomb line along Rte 4 between Kumchon and Sibyon.
John Horne Collection

The depot demands severely strained the overhaul and modification process and aircraft were not being made available to support even the reduced aircraft levels of the two combat groups operating the B-26 in Korea. When the Fifth Air Force contemplated assigning the 452nd BG to night operations in April 1951, another request was made to USAF Headquarters to equip fully the six bomb squadrons with twenty-four aircraft each, or a total of 144 B-26s. Additionally, FEAF needed a 50-per cent theatre reserve, thus requiring a total of 216 B-26s. The USAF Headquarters, facing depot delays and crew shortages, could only continue to authorize ninety-six B-26s among the six squadrons, with a 50-per cent reserve. Fifth Air Force repeated its request in June, but the USAF could only replace those B-26s lost to attrition, expected at about eleven aircraft per month.[120]

Trying another tack in September, the Fifth Air Force requested the assignment to Korea of the 126th BG, an Air National Guard unit training with B-26s for deployment to Europe. Again, USAF headquarters declined to provide additional B-26s to the FEAF.[121]

Problems of Demand

It was not until October 1951, when the B-26s were enjoying success at night over Korea, that the USAF considered increasing the authorized B-26 levels. However, the USAF could only offer non-standardized B-26s without SHORAN receivers or the other equipment specified by the Fifth Air Force for night intruder operations. To provide parts for the aircraft, the AMC reclaimed additional B-26 airframes from storage. Finally, the FEAF was authorized six squadrons with the full complement of twenty-four aircraft each by May 1952.[122]

However, such was not the outcome. Many of the B-26s that arrived in Korea in late 1951 and early 1952 were considered unusable by the Fifth Air Force. Some of the aircraft were early-production run B-26s with the framed, flat canopies. Beside the visibility problem that had precluded the use of those aircraft nine years earlier, the bulky flying gear demanded by the cold weather operations in Korea was incompatible with the tight cockpits of the older B-26s. Efforts were made at the REMCO detachments at Miho AB to bring the non-standard aircraft, called 'cat and dogs' by the crews, up to an acceptable condition for night interdiction. Lack of equipment hindered the efforts, but those aeroplanes reworked and made usable were repainted in night camouflage and sent on to Korea.[123]



***Cyclone II* was a WB-26C assigned to 12th TRS at Kimpo in late 1952.** Don Evans via John Horne

Despite the provisions of the sub-standard airframes, USAF headquarters ultimately could not supply enough B-26s to equip six squadrons fully. In the early summer of 1952 the USAF reduced authorization levels to provide the 3rd BG with seventy-two aircraft (three squadrons of twenty-four) and the 452nd with forty-eight aircraft (three squadrons of sixteen), or 120 operational B-26s and sixty spare airframes in theatre reserve. This final authorization level continued through the remainder of the war.[124] However, records indicate that the 3rd BG never achieved its full complement of authorized aircraft at any point.[125]

Airframes proved not to be the only shortage experienced by the Fifth Air Force. Aircrews were also in short supply from the outbreak of hostilities. For the 3rd BG, immediate shortages of trained navigators and bombardiers required that these crew members be assigned to three times as many missions as pilots through September 1951, when replacement crews finally began to arrive.[126] Initially, the Tactical Air Command set up a B-26 combat crew training centre at Langley AFB and trained at a rate to provide twelve replacement crews per month, roughly matching the expected aircraft attrition rate. However, the training was slow to start and the operational crews in Korea had to continue flying missions until replacements began to arrive. Because crews were flying two sorties a day, it became imperative to increase the mission requirements for duty tours, soon established at fifty-five missions. Stateside rosters were reviewed and, on occasion, rated personnel were transferred to FEAF to help bridge the gap.[127] The Tactical Air Command increased their combat crew training output to forty-five B-26 crews per month by May 1951 in an effort to provide sufficient numbers.[128]

Despite the shortages, the night interdiction missions continued uninterrupted. Each of the target areas

Medal of Honor Citation for Capt John S. Walmsley Jr

Capt Walmsley distinguished himself by conspicuous gallantry and intrepidity at the risk of his life above and beyond the call of duty. While flying a B-26 aircraft on a night combat mission with the objective of developing new tactics, Capt Walmsley sighted an enemy supply train which had been assigned top priority as a target of opportunity. He immediately attacked, producing a strike which disabled the train and, when his ammunition was expended, radioed for friendly aircraft in the area to complete destruction of the target. Employing the searchlight mounted on his aircraft, he guided another B-26 aircraft to the target area, meanwhile constantly exposing himself to enemy fire. Directing an incoming B-26 pilot, he twice boldly aligned himself with the target, his searchlight illuminating the area, in a determined effort to give the attacking aircraft full visibility. As the friendly aircraft prepared for the attack, Capt Walmsley descended into the valley in a low-level run over the target with searchlight blazing, selflessly exposing himself to vicious enemy anti-aircraft fire. In his determination to inflict maximum damage on the enemy, he refused to employ evasive tactics and valiantly pressed forward straight through an intense barrage, thus insuring complete destruction of the enemy's vitally needed war cargo. While he courageously pressed his attack, Capt Walmsley's plane was hit and crashed into the surrounding mountains, exploding on impact. His heroic initiative and daring aggressiveness in completing this important mission in the face of overwhelming opposition and at the risk of his life, reflects the highest credit upon himself and the US Air Force.

An aircraft named *Chadwick* was a long tradition within the 3rd BG dating back to the early days of World War II. In early 1952 the B-26B flown by the group commander Lt Col Robert Fortney was *The Seventh Chadwick*. This was later written off after a low-level aerobatic demonstration.
C. Hinton via Dave Menard



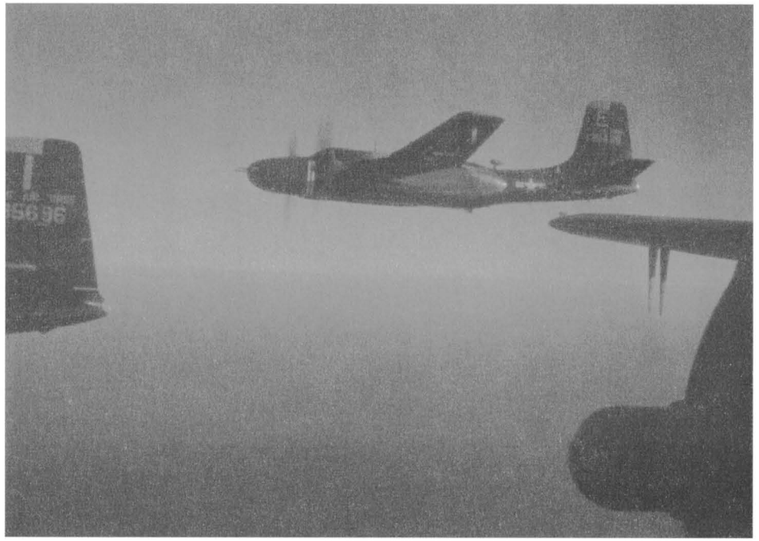
was assigned a colour codes, with red, purple, green and black being designated. Each route was then assigned a number for targeting; a particular area might be coded as Purple-13 or Red-11. Daytime interdiction efforts culminated in Operation *Strangle* in the summer of 1951, forcing the Communists to rely more upon night movements. Target opportunities for the B-26s peaked through the summer. The two bomb groups claimed to have destroyed 2,362 enemy vehicles, with another 4,959 damaged between 25 August and 15 September 1951. In October the Fifth Air Force claimed a total of 6,761 vehicles destroyed, many by night interdiction B-26s. However, verified claims proved elusive and the North Korean Army remained adequately provisioned throughout the period.

In an effort to continue their apparent success, the Fifth Air Force installed surplus Navy searchlights on selected B-26s. Special mounts were constructed to attach the heavy lights to wing hardpoints. The 70-million candlepower lights, when mounted, were about the same size and weight as a Napalm tank. They operated from the aircraft's electrical system and required 72V. The searchlight beam was directed by the navigator who, while sitting beside the pilot, controlled the light with a joystick. Early efforts by the 3rd BG to use the lights were not promising. In some cases the lights broke off the aircraft when subjected to combat manoeuvring; in other instances the lights caught fire and had to be jettisoned. As it was, the lights could be illuminated for only less than a minute and then required a 5-minute cooling- off period. The commander of the 3rd BG specified that only two aircraft per squadron were to be so modified.[129]

The B-26 crews were less than happy about using the lights, for they clearly identified the aircraft to the gunners on the ground. However, tactics were developed whereby targets would be attacked and identified with fire bombs, after which the searchlights would be employed during part of low-level strafing runs undertaken after the bombing. The lights enjoyed a limited success, demonstrated on the night of 12 September when an 8th BS crew led by Capt John Walmsley, the pilot, conducted a successful raid on a convoy, destroying at least sixteen trucks in ten strafing and bombing passes. However, the risks to the crews were also demonstrated two nights later when Walmsley tried to

This 34th BS six-gun B-26B carries the emblem of the 17th BG on the nose. Pat Marcella via Warren Thompson





A trio of blue-trimmed 95th BS B-26s over the Korean Straits in 1953. This squadron and the remainder of the 17th BG were based at Pusan East (K-9). Henry Sanders via Warren Thompson

repeat his efforts. After locating a train and making a series of attacks that exhausted his ammunition but left the train still operable, Walmsley either tried to illuminate the target for another attacking B-26 or was trying to take photographs of the light's effectiveness. Ground gunners clearly targeted the searchlight and destroyed his B-26 with the loss of the entire crew. Though Walmsley was posthumously awarded the Medal of Honor, flight crews were not enthusiastic about using the lights and the idea was soon rejected.

Through the war effort the exploits of the RB-26s of the 12th Tactical Reconnaissance Squadron (TRS) went largely unheralded. The squadron had originally deployed as the 162nd TRS in August 1950 and was soon attached to the newly activated 543rd Tactical Reconnaissance Group (TRG). The squadron relocated to Taegu AB in South Korea in October 1950 and began night photoreconnaissance missions against enemy targets. After the Chinese intervention in the late fall, the squadron relocated again back to Komami AB in Japan. In February, the 543rd TRG was reconstituted as the 67th TRG, with the 162nd TRS becoming the 12th TRS. The unit redeployed to Kimpo AB (K-14) in Korea in August 1951.

Besides the night photographic equipment installed at the Ogden depot in July 1950, the RB-26s had additional modifications for its missions. Both turrets were removed and the gunner's compartment fitted with additional navigational equipment and controls. Most RB-26s had both SHORAN and LORAN receivers installed, with bomb controls in the gunner's compartment to allow precise drops of flares and bulbs as needed for photography. The SHORAN operator, in the gunner's compartment, was in addition to a navigator riding in the nose section to provide visual intelligence for later analysis.

The RB-26s operated in conjunction with the bomb group B-26s. When targets were identified, the RB-26 crews often called in air strikes, provided whatever illumination possible and then attempted to survey the results of the strikes. RB-26s also routinely provided night reconnaissance of North Korean targets, such as airfields and railway lines, in an effort to see what repair activity was under way. Selected sites were also photographed at the request of other United Nation units as tactically needed.[130]

The impressive claims made by the two bomb groups in the autumn of 1951 were tempered in the late fall as the winter weather began to settle in. Daytime interdiction efforts were curtailed and target opportunities at night began to decrease. In December the Fifth Air Force as a whole claimed 4,290 trucks destroyed but the numbers fell in early 1952. By March destruction claims by the Fifth Air Force totalled only 1,750 trucks. Part of the decrease was due to the diversion of some B-26s away from route-reconnaissance attacks to rail-cutting efforts directed both at the railways themselves and at the repair crews employed to keep the supply lines open.

On 10 May an organizational change was made to the 452nd BG. The unit reached its twenty-first month of active duty and was deactivated in Korea. However, the personnel and equipment were transferred, as a whole, to the reactivated 17th BW and its 17th BG. The 728th BS became the 34th BS; the 729th became the 37th and the 730th became the 95th BS. During its tour, between October 1950 and May 1952, the 452nd BG had flown 15,000 sorties, 7,000 of which were at night. Approximately eighty-five crew members and forty B-26s were lost in action.

The reactivated 17th BG continued the role set by the 452th, resuming night interdiction raids. A high pace of sorties were scheduled, with the group flying 960 for the month of June, a record for the FEAF. Ninety-three sorties were flown on the night of 29 June alone.

The FEAF established a requirement for the group to fly thirty sorties per night, though this number could increase as the combat situation changed. To meet the minimum sortie rate, the group needed to schedule twenty-four crews per night for missions, with some crews flying two sorties. In June the group received nineteen replacement crews in an effort to keep the squadrons up to the minimum required staffing.

In October the group moved from Pusan East AB (K-9) to Pusan West AB (K-1) to allow the pierced steel plank runway at their old field to be rebuilt and paved. The group returned to its old home in December 1952. The pace of missions remained high, however, with more than 1,000 sorties recorded by the group in October.

The 3rd BG, having flown in excess of 20,000 sorties since the war began, experienced a series of three B-26 losses in three days of action in August 1952.

Unit Markings for FEAF B-26s		
3rd Bomb Group	**452nd Bomb Group**	**17th Bomb Group**
8th BS-Yellow	728th BS-Green	34th BS-Green
13th BS-Red	729th BS-Red	37th BS-Red
90th White	730th BS-White	95th BS-Blue
731st BS-White		

Greatly concerned, the Fifth Air Force pulled the unit out of combat for a short period to allow additional training. However, the night mission in general was losing its effectiveness. It was determined that fewer than two vehicles were being destroyed for every hundred bombs dropped, considered to be an excessive effort for the meagre results achieved.[131]

In September 1952 the Fifth Air Force decided to dedicate one squadron per group to the night interdiction mission: the 3rd BG assigned the 13th BS, while the 17th assigned its 37th BS. Part of this decision was attributed to the decreasing number of targets, but the number of inexperienced crews and the higher loss rate necessitated the pooling of the few experienced crews into single squadrons for the difficult night missions. The other squadrons began daytime raids in support of ground troops or to make attacks on enemy troop concentrations close to the lines. The response time for the B-26 missions was much better than for the B-29 medium bombers due to the lengthy missions that the latter flew from Okinawa or Japan.

Stalemate

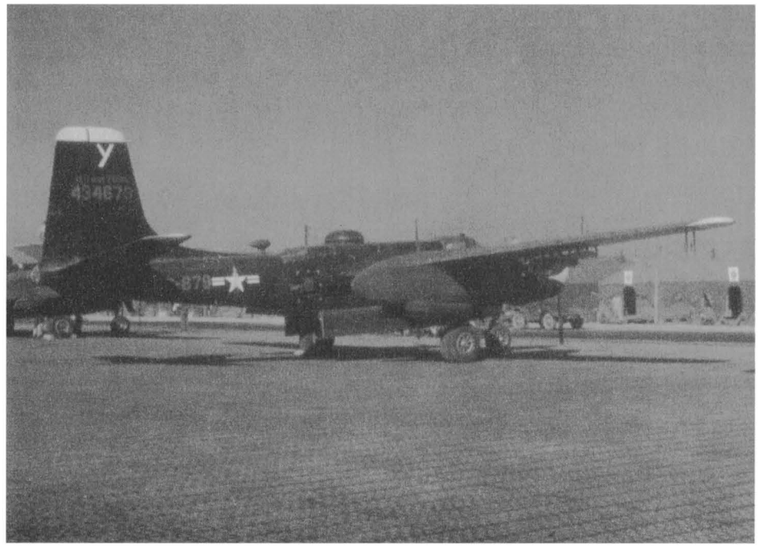
Through the remainder of 1952 and into 1953, the war continued largely as a stalemate, with the ground troops engaged in a line roughly approximating to the pre-war division between North and South. Tactics were developed for Operation *Spotlight* that employed RB-26s and C-47s working with the B-26s. RB-26s would locate night-time targets, particularly trains, while C-47 *Firefly* aircraft would illuminate the targets. Once exposed, the B-26s would sweep through the target area wreaking destruction. On 30 December six trains were destroyed using such tactics. Continued night interdiction missions in the first two months of 1953 saw sixty-two trains destroyed. Another tactic developed used glass-nosed B-26Cs to bomb a rail line to stop traffic and then cut the line behind a stopped train. Gun-nosed B-26Bs would then bomb and strafe the stranded train.

In March 1953 Fifth Air Force crews took part in Operation *Spring Thaw*. As the secondary roads became impassable, the Communist supply lines were forced on to the main roads and raids were made to block them and jam traffic. Later efforts were made to block the main roads leading to combat areas before the traffic could disperse. These campaigns achieved limited results. In the same month a reordering of target areas was made between the two bomb wings. The 17th took over the purple and black routes in north-east Korea, while the 3rd assumed the red and green routes in the east.

In April the lack of availability of experienced SHORAN-qualified navigator-bombardiers forced another organizational change. Fifth Air Force decided to concentrate all its B-26 SHORAN assets into one group, with the 17th BG being selected. The 3rd BG traded its thirteen SHORAN-equipped B-26s for thirteen non-SHORAN Invaders from the 17th BG. The SHORAN operators were subjected to intensive training that month in anticipation of a major campaign for May 1953. In February only 0.5 per cent of the 17th BG sorties utilized SHORAN; in May the rate jumped to 12 per cent. The destruction of the North Korean air bases became a prime goal for the Fifth Air Force. One of the conditions of the expected cease-fire was that no new combat aircraft could be introduced to the peninsula and the Fifth Air Force planners wanted the air assets for North Korea to remain limited.

As the war drew to a close, daylight raids continued against troop concentrations and Communist airfields. Close air support became the main objective of both bomb groups, with 17th BG aircraft averaging fifty sorties per day through June. By late July a tenuous cease-fire had been worked out between the United Nations and North Korean forces. The cease-fire, scheduled to take effect on 27 July, did not begin, however, until a 17th BG B-26 claimed the last truck destroyed and a 3rd BG B-26 dropped the last bomb of the war during a close-support mission.

The irony could not have been missed: the two belligerents stared across roughly the same line that existed on the morning



B-26B s/n 44-34679 at Kusan AB (K-8) in October 1952, while assigned to the 90th BS with the 17th BG. Squadron markings on the tip of the tail, the wingtips and the cowl rings were white. Sigmund Alexander via Warren Thompson

Night Interdiction

Night interdiction was a lonely type of mission for B-26 crews when deep over North Korean territory. One pilot flying intruder missions was Lt Robert C. Mikesh, assigned to the 17th Bomb Group at Pusan East Air Base (K-9). Mikesh later became a curator of the National Air and Space Museum. He recalled one particular mission:

We headed north-east to our assigned recce route which was the road identified as RED 11. This was our favorite, for we had been having fairly good success in this area, which seemed to be a well-traveled truck route south from Wosan. I held my altitude of 6,500ft [2,000m] and hoped that we would not cross the path of another B-26 working an adjacent route that had ventured too far south. There was very little chatter on the radio when flying these missions. Tonight we could hear broken transmissions from a 'Newhouse' aircraft – that was the call sign of the 3rd Bomb Group – for it sounded as if two of its B-26s were working close to one another on the western routes.

Looking to my left, I could faintly make out the mountain peak marked on our map as being 7,000ft [2,100m] high, but we were convinced that it went higher than 7,500ft [2,300m]. For attacks in the darkness, these altitudes given on the maps were not to be trusted and we were all forewarned. RED 11 ran generally north and south for about 25miles [40km]. Typical of nearly all the supply roads on the eastern half of North Korea, it followed a valley flanked on both sides by a ridge of steep-sided mountains. We were in luck tonight. As we approached the route from the south-west, I could see several clusters of headlights of truck convoys moving our way.

Bill Kitchens, our gunner, was in the right seat of the cockpit. This was later in the war and the two gun turrets had been removed from the B-26s to save weight as we encountered no air opposition. Yet our Air Force manning documents called for gunners as part of the crew, so we had gunners! When only three crew members were on board I had the gunner ride up front instead of in the black box (gunner's compartment) all by himself. They were given flight engineer duties, such as keeping track of fuel consumption. Admittedly it was useless and I wondered why another crew member should be subjected to combat and possible loss of life unnecessarily. But, so be it. About a third of our B-26s were equipped with SHORAN navigation equipment installed in the gunner's compartment. If this was the case, the SHORAN operator rode in the gunner's compartment.

Unlike other crews I had flown with in the past, the three of us said very little while north of the bomb lines. Everything was strictly business. Our crew bombardier was John Middleton. I could tell by the tone of his voice as he gave heading directions that he was already bent over the Norden bombsight, synchronizing on something. I held my heading until he called for a change of direction. 'Follow the PDI [Pilot Direction Indicator] now, pilot.' This preciseness of John's instructions meant that he really had something going and used an expression left over from his B-29 bombing days during WWII. I made a half standard rate turn to the left to center the PDI needle. This was an instrument that took its reading from the bombsight itself, giving the pilot the direction and amount of left or right correction to make.

John called for the bomb bay doors to be opened. My fingers identified the switch in the center of my instrument panel and moved it to the 'up' position. There was a slight bobble of the airplane and a rumbling sound of disturbed air as the doors opened. I added three inches of manifold pressure to hold 215mph [350km/h] indicated and a slight correction with the rudder kept the PDI centered.

'Steady – steady.' The measured words from John indicated to me that he had something in the crosshairs and was about to drop. 'Bombs away!' came the jubilant sound from John in the nose section. I often thought this phrase, another left-over from World War II, sounded a bit like Hollywood after all this time, but in the absence of something better it conveyed the message. I closed the doors and continued my count '… six – seven…' and pulled hard left. Looking down, I could se the lights of the trucks still on as the fragmentation bombs began sparkling over their pattern of impact. Then two distinct yellow bursts indicated we had scored something big by the size of the secondary explosions.

'Break left – break left!' These urgent shouts from Bill in the right seat transformed our moment of triumph into one of sheer panic as I twisted the wheel further left to widen our distance from the line of 'ping pong ball' streaking up at us. Just then, they were on our left and I reversed full turn in the opposite direction with everything I had, diving at the same time to change altitude in case they had us plotted on radar. A single round came up, straight in front of the nose and I knew for every tracer we could see, there were five rounds that we couldn't! But it all ended as quickly as it began. Some



Lt Robert Mikesh at the completion of his fiftieth mission on 22 November 1952, at Pusan AB. Mikesh flew with the 17th BG. Robert Mikesh Collection

pilots criticize the position of the B-26 engines for blocking visibility, but at times like this they are great to hide behind! As we gathered our composure off to the west of recce route, I became aware that my Ban anti-perspirant had just given out. If I were a cigarette smoker, I believe I would have had one about then, but none of us smoked. We were shot at nearly every mission, but these rounds seemed unusually close tonight. It was not until seeing television coverage of night anti-aircraft fire over Baghdad during the Persian Gulf War that had I seen anything to approximate what this looked like.

We still had more bombs to drop and we hadn't even exceeded the first hour of our two hours during which we were to cover this area, so best get back to work. I was sure that John had made note of the area where we were shot at and wouldn't have us cross it again tonight. Tomorrow, the mobile guns that had caused our moment of terror would be somewhere else.

We turned north again up the road and the lights from more convoys could still be seen. Normally they would have been scared off by now, having seen the preceding display that revealed our presence. The convoy lights showed the determination of the North Koreans and Chinese to keep supplies moving. I opened the bomb bay doors and I knew John was lining us up for another run, but then came John's frustrated words 'Bomb doors close, pilot.' I could sense by the tone of his voice that the trucks had turned off their lights. At strategic locations, a sentry would be posted on a prominent hill, easily seen by the traffic below. Should he hear the sounds of engines, he would fire a flare to signal drivers to turn off their lights. John said that he saw a flare go off just before the lights were extinguished. Night after night, we would go up and down the entire route chasing lights only to have them go off at a critical moment. Other nights they seemed to stay on defiantly.

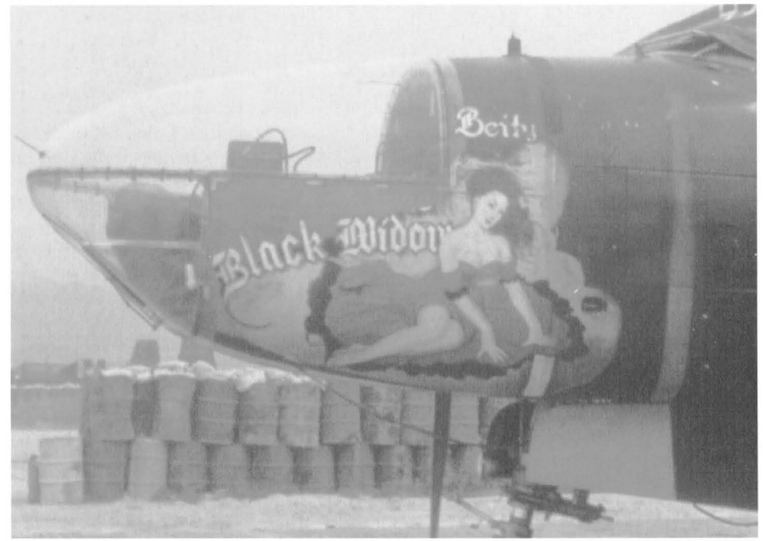
We were lining up now on another convoy, expecting the same problem with light going out – and they did. But this time they were too late. John had already obtained a synchronization on the middle truck before their lights went out and the Norden bombing system was on its own. Two more bomb shackles released four clusters amounting to two dozen 28lb [13kg] fragmentation bombs. If any one of these hit within a hundred feet [30m] of an unobstructed truck, its kill was virtually assured. Hard left again to see what might happen. Still no truck lights below, but there were the sparklers. 'Wow, did you see that?' I reversed my turn sharply to the right so Kitchen could see from the right seat. It was a big ball of well-sustained orange flame. If we missed the trucks, we certainly hit something big instead – perhaps a fuel supply of some sort.

Night Interdiction *continued*

Our next three drops brought negative results, with the lights going out before John could really get synchronized on them, although, in desperation, we hoped for the best and dropped anyway. We had only two clusters left now and about thirty minutes of our two hours still remained. The time passed quickly and I lost track of the dry runs we made – perhaps six or seven. We made another, hoping to catch a convoy off guard at the north end of the route. All the truck lights but one went off and John kept it in the center of his crosshairs, adjusting for the speed that the truck was making. The last bombs tumbled out of the bomb bay and I waited for the count. There were the sparklers – then a disappointing nothing. But just as we were ready to turn away, past the normal detonation time to set something off, first one blue flame and then another nearby erupted as things began to explode. In rapid succession, there must have been six to eight major explosions followed by balls of colored fire. Alcohol, gasoline – I didn't know – but reporting the color seemed important when we recorded these strikes during our intelligence debriefing after the mission. It had turned out to be a productive strike after all.

of 25 June 1950. The first bomb and the last bomb of the war had been dropped by a 3rd BG, 8th BS B-26. It was an unsatisfactory result for the effort put forth.

As for the B-26, it performed under conditions for which it had never been designed. The record would suggest that the USAF and the FEAF had its hands full trying just to maintain its meagre light bomber force, let alone equip the aircraft properly, provide the required training or fully equip the squadrons. The B-26 enjoyed success in its night interdiction role, though to what extent remains in question. The B-26 was rarely equipped with any type of electronic countermeasures or radar. Its navigational capability at night was limited to contact flying, ground-directed radar or SHORAN. However, flight and ground crews pressed the attack with what they had and the significant successes achieved can more properly be attributed to their efforts than to the night interdiction capability of the B-26. Some 154 B-26s were lost to all causes in the war. The B-26 was earmarked for replacement with jet-powered and specially-equipped Martin B-57s long before the war ended; however, the B-26 was the available aircraft and was used to the last sortie.



Below: ***Lizzie II*, a B-26B (s/n 44-34334) undergoes gear retraction tests on a cold 21 December 1950, at Pusan East AB, Korea, while assigned to the 452nd BG.** Dave Menard



Above: ***Black Widow* was a 37th BS B-26C assigned to the 37th BS at Pusan AB in this 1953 view. The 37th BS used red trim to identify their aircraft through the 17th BG.** Dexter Martin via Warren Thompson

CHAPTER EIGHT

A-26 and B-26 in Foreign Service

The Invader was employed operationally far beyond the confines of service with American forces. As an instrument of American foreign policy, it was the bomber of choice for export to developing countries, particularly those in Latin America. In the early post-war years the North American B-25 had been central to American military assistance programmes, but by 1950 those nations were seeking the higher performance and capability of the B-26. The B-26 served through the 1950s, the 1960s, and well into the 1970s as a front-line bomber with numerous foreign air forces. The definitive resource for foreign use of the B-26 is the book by Dan Hagedorn and Leif Hellström (*see* Bibliography). A summary of the Invader's military use beyond the AAF and the USAF is presented here.

The United Kingdom: Royal Air Force (RAF)

In July 1944, the AAF transferred one of the early A-26s, s/n 41-39158, to the RAF for evaluation. Though officially transferred, the RAF did not assign a serial to the aircraft. Through a testing period between 14 July and 24 August 1944, the Aeroplane and Armament Experimental Establishment at Boscombe Down evaluated the A-26. The aircraft crashed in September 1944 at Swanton Morley airfield in Norfolk, but the RAF was sufficiently interested to request the transfer of 480 A-26s from the United States through Lend-Lease. Apparently, there were also plans to equip New Zealand and Australian squadrons with the aircraft, though these never materialized. Instead, the RAF requested 150 A-26s to replace A-20s and B-26s in service in the Mediterranean. In early November 1944 the AAF agreed to transfer 140 new A-26s to the RAF, this at a time when A-26 production was still trickling out. In mid-December the AAF agreed to start with the transfer of two A-26s (s/n 43-22479 and s/n 43-22482) to the RAF from a replacement depot in the United Kingdom. These aircraft were to be among the 140 and were assigned the RAF serials KL690 and KL691 upon delivery to Boscombe Down. Meanwhile, purpose-built A-26Cs were being delivered at Tulsa and earmarked for Britain, finished with RAF markings and RAF serials. By April 1945 a substantial part of the order was awaiting delivery, but the RAF decided that with the war ending there was no need for the aircraft. The block of 138 A-26C were instead diverted to the US Navy as JD-1s. The two RAF Invaders were operated until early 1947 when they were returned to the United States and subsequently transferred to the US Navy.

The Royal Air Force was earmarked 140 A-26s via Lend-Lease for delivery in the first half of 1945. Due to the changing war situation, only two were actually delivered, these receiving the RAF serials KL690 and KL691. The rest, though completed by Douglas at Tulsa in RAF markings and with RAF serials, went undelivered. They were all turned over to the US Navy for use as JD-1s. This view shows the first of the undelivered RAF Invaders, KL692. The aircraft remained in RAF markings for several months after the Navy received them. Boeing Historical Archives



Mutual Defense Assistance Programs

Before 1949 the United States transferred military equipment to allied nations on a case-by-case basis. The USA had a huge supply of surplus warplanes and, through the early post-war period, the American military and the State Department provided aircraft as needed, transfers to Turkey and several Latin American nations being examples. For Latin America, transfers were accomplished under what became known as the American Republics Program (ARP), whereby numerous nations in the region received stocks of North American B-25 Mitchells and Republic P-47 Thunderbolts.

As the Cold War began, the United States sought to integrate military assistance as a response to perceived Soviet expansion. To enlarge and standardize the military assistance programmes, and as part of the newly proclaimed Truman Doctrine, the United States enacted the Mutual Defense Assistance Act of 1949. Under the general provisions of the legislation, the USA agreed to make available to certain nations military equipment and training at a no-cost or low-cost basis. For Fiscal Year (FY) 1949, $1.4 billion was appropriated to the programme, 76 per cent of which was earmarked for Europe and the participating nations of the new North Atlantic Treaty Organization (NATO). Another 16 per cent was slated for Greece and Turkey. However, as the perceived threat of Communist expansion widened to include south-east Asia and Latin America, the Mutual Defense Assistance Program (MDAP) was expanded accordingly. MDAP treaties were established in south-east Asia beginning in 1950. Between 1952 and 1954 the American government signed bilateral pacts with ten Latin American nations: Ecuador, Cuba, Colombia, Peru, Chile, Brazil, the Dominican Republic, Uruguay, Nicaragua and Honduras, many of which would eventually receive MDAP B-26 Invaders.

Under the treaties established for MDAP, a Military Assistance Advisory Group (MAAG) was normally established by the USA in each country to assist in determining the matériel and training requirements. The MAAG would then co-ordinate with the State Department and the military services to provide needed items within the political, military and budgetary constraints of the programme. Nine countries eventually received B-26s under MDAP.

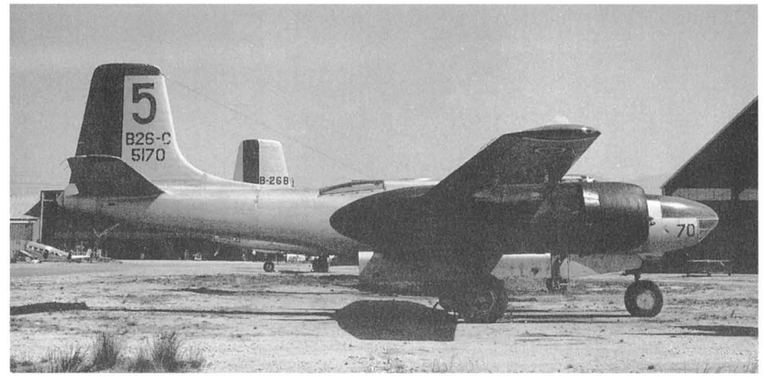
Brazil: Forca Aérea Brasileira (FAB)

The Forca Aérea Brasileira obtained thirty-one B-26s from American military storage stocks beginning in 1956. Under the auspices of MDAP, the Brazilian government initially obtained fourteen B-26Bs and fourteen B-26Cs and selected airframes from those stored at Davis-Monthan AFB. After overhaul by Fairchild Aircraft, the aircraft were delivered to Brazil between September 1957 and February 1958. The B-26s were obtained by FAB to replace a like number of B-25s procured earlier, also under the MDAP. The B-26s were assigned to the 5 Grupo de Aviacão at Natal, becoming operational in June 1958 in two squadrons of fourteen aircraft. The squadrons were used to conduct training and nominally, operate as attack squadrons. The B-26s were sequentially numbered between B-26B FAB 5145 and B-26C FAB 5172.

In 1963 all B-26s were centralized into one squadron, still with 5 Grupo de Aviacão. The unit moved to the Base Aérea do Recife in 1971, and operated until it was disbanded in 1973. The B-26s continued in service with the 10 Grupo de Aviacão at Base Aérea de Sao Paulo, which operated nine B-26s until 1975.

In 1967 the FAB arranged to have sixteen B-26s rebuilt by Hamilton Aircraft at Tucson, Arizona. During the overhauls one of the B-26s was found to be in such poor shape that it was withdrawn from service and replaced by a surplus B-26 at Tucson. Two additional surplus B-26s were also obtained at the same time. Thus eighteen refurbished B-26s returned to the FAB in 1968. They were redelivered in a paint scheme similar to that worn by the B-26Ks in USAF service, consisting of a two-tone glossy green over light grey with a sharp demarcation line between the colours. The three new aircraft were added as B-26C FAB 5173 to B-26C FAB 5175. Despite the overhauls, continuing structural problems associated with the wing spar caused the type to be withdrawn from service by 1975.

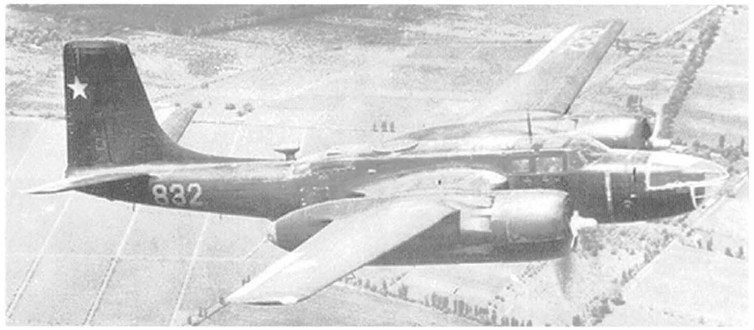
One additional B-26 was added to the FAB inventory in 1966. The B-26B, carrying the US civil registration of N115RG, had been seized by the Brazilian government in June 1966 for suspected smuggling activities. The aircraft had been modified to a passenger transport configuration by an American company LeTourneau in 1954 and was ideally suited as a cargo hauler, for which the FAB utilized the aircraft. This B-26 was carried as a CB-26 with the serial FAB 5176 assigned, suggesting that it was perhaps formally added to the inventory after the three additional B-26s had been added in 1967. It was also withdrawn from service in 1975.



The Forca Aérea Brasileira received thirty-one B-26s via the Military Assistance Program beginning in 1957. This example, FAB 5170, had operated as s/n 44-35264 with the USAF and was delivered to Brazil in February 1958. It served until December 1975. Duane A. Kasulka via AAHS

Chile: Fuerza Aérea de Chile (FACh)

The FACh had been provided with B-25s through the ARP, beginning in 1946. By the early 1950s the MDAP offered replacement B-26s from USAF stocks held in storage. In November 1954 ten B-26Cs were transferred to the FACh and issued serials between FAC 812 and FAC 821. The FACh assigned the B-26s to Grupo 8 at Antofagasta in northern Chile. Grupo 8 also operated B-25s and



One of the thirty-eight B-26s transferred via the Mutual Defense Assistance Program to Chile between 1954 and 1958 was FAC 832.

other types. Eighteen additional B-26Cs were delivered in 1956 and 1957, with ten more following in 1958. A total of thirty-eight B-26s were transferred between 1954 and 1958. By 1962 the total available had been reduced to twenty-two B-26Cs and two B-26Bs through attrition and losses.

In 1963 the B-26s were sent through a USAF sponsored programme at Albrook AFB, Panama, to replace cracked wing spars, a problem endemic to the ageing Invaders. However, inspections conducted before the beginning of the programme permanently grounded seventeen of the FACh B-26s. To help to replace the loss of half their B-26 fleet, at least six additional B-26s were transferred between 1963 and 1965.

By 1968 the FACh B-26 inventory stood at sixteen aircraft, of which two were used as transports, with the remainder assigned to Grupo 8. By 1974 the B-26s had been relegated to a support role in favour of Hawker Hunters, and the last operational B-26s were withdrawn from service in 1979 and scrapped.

Colombia: Fuerza Aérea Colombiana (FAC)

As part of the MDAP, the FAC was supplied with a total of nineteen Invaders, seventeen B-26Cs and two B-26Bs. The first seven aircraft were delivered beginning in late 1954, and were assigned to the 1st Escuadron de Contra-Submarino (1st Anti-Submarine Squadron) and based at Villavicencio. Ostensibly, the B-26s were for maritime patrol, but in practice the deliveries were made to balance acquisitions made by nearby Venezuela and to meet internal insurgency threats. Seven more B-26s were delivered by the end of 1956, with a further five in 1957. The B-26s experienced the wing spar cracks typical of the ageing type and survivors were sent through the USAF re-sparring programme conducted at Albrook AFB, in the Panama Canal Zone, in the mid-1960s. After July 1968 only two FAC B-26s remained operable, and the type was retired from service altogether after 1972.

Cuba: Fuerza Aérea del Ejecito de Cuba (FAEC) and Fuerza Aérea Revoluncionaria (FAR)

The FAEC received eight B-26Bs and eight B-26Cs, beginning in late 1956 as part of a MDAP transfer. Single examples of both the TB-26B and TB-26C were also transferred for training purposes. The aircraft were based at Campo Columbia near Havana and were assigned somewhat random serials between 901 and 935. The B-26s enjoyed limited use before the revolution that put Fidel Castro into power in 1959, including the repression of an earlier coup attempt in 1957 against the Batista government. FAEC B-26s were also ineffectively employed in strikes against the Castro insurgents in 1958 and 1959.

After the government changed hands in 1959, the Cuban air force was reorganized as the FAR, inheriting at least fifteen B-26s from the FAEC. However, most were not operational nor were trained flight crews available. None the less, the FAR was able to muster six B-26s, most of them based south of Havana, and enough crews for operations during the Bay of Pigs invasion in April 1961. One FAR B-26 was lost during an air raid and two others were damaged, leaving three FAR B-26s operable during the remainder of the failed invasion. One was shot down on 17 April over the Bay of Pigs and the other two were withdrawn from service the following day. Though the invasion was ultimately repulsed, no further FAR B-26s operations were undertaken.

As an aside, the American Central Intelligence Agency (CIA) engineered a counterfeit FAR B-26, carrying the serial of FAR 933, that landed at Miami on 15 April 1961, with its pilot a supposed Cuban defector. That particular B-26 remains unidentified but was reportedly flown for storage at Davis-Monthan AFB. The B-26 currently displayed in Havana as FAR 933 is not an FAR aircraft at all but one acquired in Angola during Cuban operations there in the 1970s.

France: L'Armée de l'Air (AA)

France employed two distinct groups of B-26s: one in their Indo-China War of 1950–54 and those operated by the AA in France and North Africa between 1951 and 1968.

For the Indo-China War the French requested American assistance in their efforts to quell insurgent Vietnamese beginning in 1950. In May 1950 it was announced that the United States would provide the AA with aircraft, but the basis for the planning changed dramatically with the onset of the Korean War. However, in January 1951 twenty-five B-26s were scraped together by the USAF from stocks in Japan and the United States and transferred to the Groupe de Bombardement 1/19 at Tourane, what is now Da Nang, Vietnam. All the B-26s operated by the AA in Indo-China used their former USAF serials for identification. The French B-26s began combat operations against the Viet Minh in February. Five RB-26Cs were subsequently transferred from the USAF in August 1951 to enhance the reconnaissance capability of the AA. Then, in the spring of 1952, a second squadron of B-26s was established and sixteen additional B-26Cs were transferred, for a total of forty-six aircraft

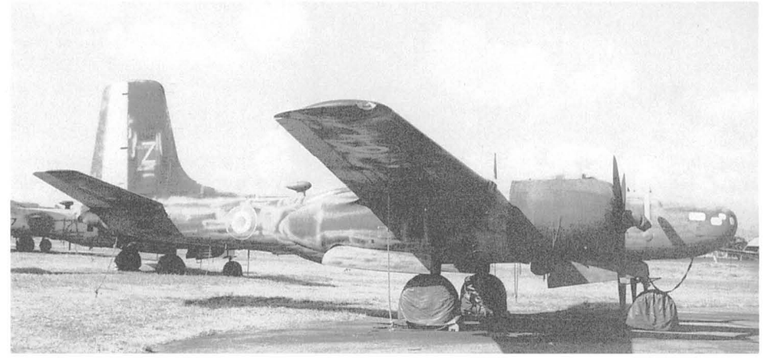


Line-up of L'Armée de l'Air (AA) B-26 veterans of the French War in Indo-China at Clark AB in June 1958. The B-26C in the centre is s/n 44-35747 which served with France between March 1952 and October 1955. Lionel Paul Collection

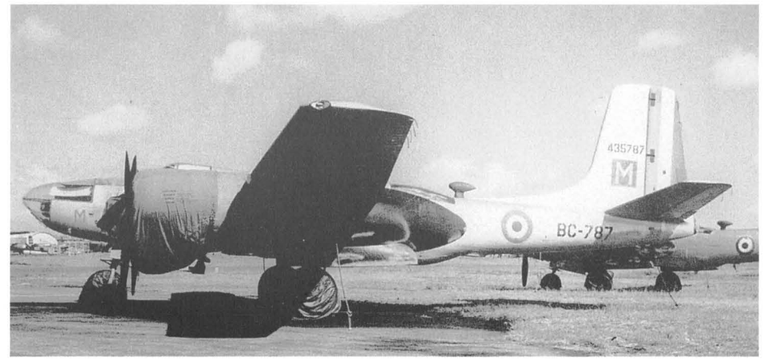
received between January 1951 and April 1952. In March and April 1953 an additional eight B-26s were received from the USAF to replace the seven B-26s lost during the first two years of the war. Additional transfers were delayed due to the operational requirements of the USAF in Korea.

With the war situation deteriorating for the French in 1954, the USAF lent an additional fifty-five B-26s and four RB-26 to the AA, along with personnel to support the aircraft. These aircraft were not formally transferred, instead remaining officially as USAF aircraft assigned to the FEAF. However, in the spring of 1954 the French war effort collapsed at Dien Bien Phu and the war ground to a halt in July. Records indicate that the B-26s had flown 15,000 sorties since 1951. The French obtained the use of 113 B-26s, including nine RB-26Cs, during the war, with the loss of twenty-six aircraft. Over the span of the next year all the surviving B-26s were returned to the jurisdiction of the USAF; a number of them ended in storage at Clark AB in the Philippines and were scrapped.

Aside from their utilization in Indo-China, the French also operated a significant fleet of B-26s in domestic service and for counterinsurgency



Another of the retired L'Armée de l'Air Invaders at Clark AB in 1956. The B-26s used by the French in Indo-China were direct loans by the USAF; at the end of the war the survivors were returned to the USAF and usually scrapped. Lionel Paul Collection



B-26C s/n 44-35787 at Clark AB in November 1956. It served in French Indo-China between March 1952 and November 1955 before being scrapped at Clark AB. Lionel Paul Collection



Though the markings appear to be 7009, it is probable that this aircraft is actually Z009 and one of the first group of seven Invaders to be purchased for the L'Armée de l'Air in 1953. These were from purchased from an American aircraft dealer. This aircraft, s/n 41-39223, had carried the US civil registration of N74Y for a short period. It served in France from 1953 until October 1965. It was withdrawn from service but still survives in the collection of the Musée de l'Air in France. Lionel Paul Collection

operations in Algeria. The first Invaders that went to the French government were five surplus B-26s purchased on the American civil market in 1950 and 1951. These were part of the group of Invaders built by Douglas but not accepted for service by the AAF. They were transferred direct to the RFC and became the only A-26s available on the open market during the first five years after the war. They were assigned to the Cintre d'Essais en Vol (CEV, or Flight Test Centre) at Brétigny-sur-Orge near Paris, where they operated as test beds for French military aviation equipment. For serial numbers the CEV evidently used variations of the last American civil registration or manufacturer's serial number. Two additional B-26s were obtained for the CEV in 1953 from Mexican sources.

In 1953 the French government also purchased seven additional B-26s for assignment to two AA units for utility and target-towing duties. These seven came from USAF surplus stocks obtained in the United States by a dealer and assigned AA serials between Z003 and Z009.

However, with the nationalistic insurgency movement growing in Algeria, the AA sought to equip two B-26 squadrons for service there. In late 1956 the USAF transferred fifty B-26Bs and B-26Cs to the AA through the MDAP. All the transferred aircraft were delivered by March 1957 and most were veterans of either the Korean War or the French Indo-China War. These aircraft had, peculiarly, AA serials based upon the Douglas fuselage numbers assigned when they were being built at either Tulsa or Long Beach. How or why this system was established is unknown. The serial usually had the suffix of B or C added to denote the B-26 series.

In 1956, too, twelve RB-26Cs were transferred from USAF stocks in England through MDAP. These aircraft were organized into a reconnaissance squadron based at Cognac in south-western France. These aircraft reportedly used the last three digits of their USAF serial numbers for their AA serials.

A detachment of RB-26Cs deployed to Algeria in November 1956. In 1957 two B-26 bomber squadrons were deemed operational and also deployed there. For the next five years the AA employed its B-26s in the close-support and counterinsurgency roles. By June 1959 the AA had lost ten of its B-26s from various causes, mainly combat, and the USAF supplied an additional twenty-six from a USAF depot at Chateauroux, France, thus bringing the total of USAF-transferred Invaders to eighty-three B-26s and twelve RB-26s. After 1959 all the surviving aircraft had their AA serial numbers changed to reflect their original USAF serial numbers.

The French developed some specialized modifications for the Invader. These included the RB-26P, an improved reconnaissance version, of which seven



This B-26B, carrying the serial of Z001 and the name *El Fantasma* was purchased by the French from the Mexican government in April 1953. It had operated in Mexico as a quasi-government aircraft for executive transport. The French assigned the aircraft to the Centre d'Essais en Vol, a flight test centre near Paris. This view shows the aircraft at New York on 21 September 1953. William J. Balogh, Sr. via Dave Menard



These B-26s, all Korean War veterans, are shown at Clark AB, Philippine Islands, in 1954, shortly before they were transferred to the French L'Armée de L'Air for service in Indo-China. Dave Menard

were converted; a radar trainer version, designated the B-26APQ13, of which six were converted; and the B-26N night fighter, of which eight were converted.

When the Algerian War ended in 1962 the surviving B-26s were deployed back to France and within a few years were removed from service. By 1968 all had gone, though some of the original CEV B-26s may have remained in service a little longer. Most of the aircraft were scrapped, though a few enjoyed preservation either with sales to civilian buyers, mainly in the United States, or transfers to French air museums.

Guatemala: Fuerza Aérea Guatemalteca (FAG)

The FAG had unsuccessfully requested the provision of B-26s through the MDAP during the late 1950s as replacements for its ageing fleet of Beechcraft AT-11s. It was not until the CIA determined to use Guatemalan bases to train Cuban exile forces for the Bay of Pigs invasion that B-26s were supplied. Eight B-26s, including single examples of an RB-26 and a VB-26, were drawn from USAF storage at Davis-Monthan AFB, overhauled and delivered to Guatemala in August 1960. They were assigned FAG serial numbers between 400 and 428, jumping in sequence by four numbers between aircraft. However, the CIA arranged to use six of the B-26s to train Cuban flight crews at a secret base in Guatemala before the actual possession of the aircraft was released to the FAG. The B-26s were operated from a remote base at Retalhuleu, in full FAG markings, by American and Cuban crews through April 1961.

Once the B-26s were turned over to the FAG they quickly became operational. Shortly afterwards, they were sent through the spar replacement programme being conducted at Albrook AFB. By 1967 the six surviving B-26s (two had been lost in operational accidents) had been mostly withdrawn from service.

Peru: Fuerza Aérea de Peru (FAP)

The FAP received eight B-26Cs through the MDAP in October 1954, the first Latin American nation to receive examples of the type as part of the programme. The eight were assigned to the 21st Escuadron de Bombarderio Ligero at Chicalyo. Two B-26Cs were provided in December 1956, four more in December 1957 and four more in March 1958. Two additional B-26Cs were supplied by the USA in June 1960 as replacements for aircraft lost. Thus a total of twenty B-26Cs were transferred for service in Peru. The first eighteen were assigned FAP serials in a block between 570 and 587. In 1960 those surviving B-26Cs and the two replacement B-26Cs were assigned new serials in a block between 214 and 230.

In 1964 and 1965 fourteen of the FAP B-26s were sent to Albrook AFB to allow USAF contractors to replace or repair their wing spars. In the mid-1960s the FAP also reorganized its air force units, with the 21st Escuadron becoming the 721st Escuadron and being based at Piura. During their employment the FAP Invaders did not see any combat action, despite several conflicts with neighbouring Ecuador during the period. The B-26s were withdrawn from service by 1975, at which time only five aircraft were actually operable.

Saudi Arabia: Royal Saudi Air Force (RSAF)

The RSAF obtained nine surplus B-26Bs from USAF stocks in 1955. Of the first batch of six, one came from USAF storage and the other five from USAFE units being re-equipped. The last three also came from USAFE units. It appears that the B-26Bs were more window-dressing than operational aircraft, as there is evidence to suggest that most, if not all, of the aircraft were not in use after 1957. The aircraft were stored at Jeddah, the maintenance base, and most eventually became derelict. In 1976 seven of the aircraft were still observed at Jeddah. These aircraft were no longer present in 2001 and they were presumably scrapped. In 1976 an eighth aircraft was seen on display near Riyadh, though the current status of this last Invader is not known.

Turkey: Türk Hava Kuvvetleri (THK)

The United States responded to post-war Soviet threats to Turkey by agreeing to provide thirty A-26s, 180 P-51s and a variety of other aircraft to the THK in 1947. The THK became the first recipient of the Invader under the MDAP. All of the A-26s provided were drawn from storage depots in southern Germany, primarily from Oberpfaffenhofen. These aircraft had been part of the occupation forces brought into Germany from France and Britain in the fall of 1945 and had been in storage ever since. Upon the basic framework of the Truman Doctrine, issued in March 1947, the USAF withdrew thirty Invaders from storage, overhauled them and delivered them to Ankara in the spring of 1948. These aircraft were assigned THK serials between 7401 and 7430 and were an evenly mixed group of A-26Bs and A-26Cs. The following year an additional fifteen aircraft, by now designated B-26s, were transferred, these consisting of thirteen B-26Bs and two B-26Cs and assigned THK serials between 7431 and 7445. The last group of aircraft also came from the storage depots in Germany and were among the last to be withdrawn for use. The balance of the stored aircraft were soon scrapped.

The THK assigned its B-26s to a B-26 regiment with two companies based at Etimesgut AB at Ankara. Some aircraft were also assigned to a reconnaissance unit. The B-26s operated in conjunction with a number of other types, including Mosquitoes. By 1952 the B-26s had been relegated to second-line aircraft by efforts to equip the THK with jets, particularly the T-33 and the F-84. By 1954 operational B-26s were primarily being used for target-towing duties and, by 1958, the balance of the surviving B-26s were completely withdrawn from service. The entire THK B-26 inventory was subsequently scrapped.

Non-governmental Acquisitions

Seven countries or would-be countries made such acquisitions.

Biafran Air Force

The Nigerian civil war of 1967 that engendered the short-lived nation of Biafra saw that meagre air force obtain a pair of B-26 for use in attacks against the stronger Nigerian federal forces. The first B-26 had actually been purchased the year before and set aside for use. It was obtained from France in July 1966 and stored in Belgium until ferried to Biafra in June 1967. By August the B-26 was being operated by mercenary and Biafran aircrews. It was crudely rearmed with single forward- and aft-firing machine guns and carried homemade bombs for use in attacks against federal forces. A second B-26 was obtained in August 1967, reportedly also from France, and this aircraft was rearmed and used operationally. Shortly after the second B-26 arrived the first was grounded for lack of parts. The Biafran air force also briefly used a pair of B-25s and at least one mission was flown using a single B-25 and B-26, certainly one of the few times that the two famous bombers had been paired. In December 1967 the sole flyable B-26 was damaged after a wheels-up landing occurred and apparently never flew again. The Biafran war struggled on for another two years before Nigeria prevailed. Presumably any remains of the two Biafran B-26s were scrapped shortly afterwards.

Dominican Republic: Fuerza Aérea Dominicana (FAD)

During the regime of Rafael Trujillo the FAD operated a large and diverse fleet of aircraft, some supplied by the United States under MDAP. However, through a number of factors, the USA was reluctant to satisfy a request in December 1958 made by the government for the transfer of twelve B-26Bs. The American government rejected the request and suggested that the FAD attempt to get the Invaders from a surplus USAF source in the United States. Shortly afterwards, an attempt was made to export twelve civil B-26Bs from Florida Aerocessories to the FAD. However, this arrangement fell through. In 1959 another attempt was made to export five civil B-26Bs from a company Manhattan Industries, to the FAD. The American State Department denied the export licence request but, shortly afterwards, approved one for the same aircraft to be exported to a Chilean photo-mapping company. During the delivery flights the aeroplanes diverted to the Dominican Republic where they were seized. The five B-26Bs were added to the FAD inventory and given FAD serials between 3202 and 3206. Two additional B-26Bs may have been obtained and assigned the serials of 3201 and 3207. The B-26s were re-equipped, as well as possible, for combat operations but carried non-standard armament. After Trujillo's death in 1961 the FAD unsuccessfully attempted to obtain additional B-26s from USAF stocks. The B-26s were largely withdrawn from service by 1967 and reportedly scrapped. Little information is available about the FAD B-26s.

El Salvador: Fuerza Aérea Salvadoreña (FAS)

The infamous Soccer War of 1969 between El Salvador and Honduras resulted in both countries seeking to obtain a number of B-26s and resupply their air forces with surplus World War II fighters. For El Salvador, the FAS obtained eleven P-51Ds and two B-26s from civil sources in the United States, with the B-26s arriving in the country after the war had ended. None the less, the two B-26s were added to the FAS inventory, with the serials 600 and 601



An example of one of the B-26s operated by the Fuerza Aérea Dominicana (FAD) beginning in 1959. The US refused to supply the aircraft so they were obtained on the civil market and covertly diverted to the Dominican Republic. A total of seven B-26s were operated by the FAD, most of which had been withdrawn from service by 1967. Gary Kuhn

being applied. The B-26s were operated from the base at Ilopango. Four additional B-26s were obtained the following year, three coming from civil sources in the USA and one from the Guatemalan air force. Though six B-26s were carried in the inventory of the FAS, only three were apparently operational. By February 1972 most were in storage at Ilopango and, by 1974, had been withdrawn from service. Several of the FAS B-26s and most of the P-51Ds were later sold to new 'warbird' owners in the United States. One of the B-26s, N3222T, had been operated by the Confederate Air Force before being sold to El Salvador, and that aircraft eventually returned to the CAF with the same civil registration.

Indonesia: Angkatan Udara Republik Indonesia (AURI) and Tentera Nasional Indonesia-Angkatan Udara (TNI-AU)

The AURI unsuccessfully attempted to obtain B-26s on several occasions during the 1950s from MDAP sources. Deteriorating relations between the USA and Indonesia, precipitated by CIA efforts in support of a coup, led the Indonesian government to obtain B-26s by purchase from USAF surplus sales. The AURI, otherwise equipped largely with B-25s and P-51s, was able to obtain six surplus B-26s in August 1959. These were overhauled in the United States and delivered in AURI markings to Indonesia in 1960. Furthermore, evidence suggests that the AURI attempted to purchase two additional civil B-26s, with all eight aircraft assigned a serial block between M-261 and M-268. The delivered aircraft were fresh from USAF service and at least some were equipped with turrets and other armament hardpoints, but with no weapons. The two additional B-26s were apparently never delivered from the USA and the serials went unused.

The AURI B-26s were assigned to Skadoron 1 at Abdurachman Sela, near Malang in south-eastern Java. They were used operationally during several of the many conflicts involving Indonesia during the 1960s and the 1970s. As late as the mid-1970s, three B-26s of the renamed TNI-AU remained in service and combat-capable. However, by late 1977 all the B-26s had been withdrawn, with the last preserved in a museum in Yogyakarta.

Honduras: Fuerza Aérea Hondureña (FAH)

Both El Salvador and Honduras sought to obtain a number of B-26s when their Soccer War erupted. Otherwise equipped with variants of the F4U Corsair, the FAH was able to obtain a single example of the B-26 from a civil source in Costa Rica. This particular B-26 had been earlier linked to a privately-planned attack on Cuba and the airframe apparently languished in Costa Rica between 1962 and 1970. Once the FAH had obtained the B-26, it was returned to something like an operational configuration and painted overall black. It was initially assigned the FAH serial of 276 but this was later changed to FAH 510. The Invader remained in service with the FAH until 1980, becoming the last known operational military B-26. FAH 510 was sold to a American buyer and, through a series of trades, ended in the USAF Museum on display at Lackland AFB, Texas.

Mexico: Fuerza Aérea Mexicana (FAM)

A total of four B-26s were ostensibly operated by the Mexican government, primarily for VIP transportation. The first was acquired as a civil aircraft in September 1949 and was eventually operated under the Mexican civil registration of XB-PEK. This aircraft was later assigned the FAM serial of 1300. Three other B-26s were obtained around 1953 and were assigned FAM serials of Z001, Z002 and Z003. Two of those were quickly exported to France. The fate of the other two B-26s remains unknown but they were withdrawn from service by the early 1970s.

Portugal: Forca Aérea Portuguesa (FAP)

In the early 1960s the Portuguese government was trying hard to hold on to its colonies, particularly those in Africa. By 1964 the country was fighting three insurgency wars in Angola, Guiné and Mocambique. With the need to increase its air force quickly, Portugal sought to purchase surplus B-26s in the USA. However, international concern over the nation's repressive efforts in Africa precipitated a United Nations weapons embargo on Portugal. The State Department thus refused to issue export licences for any ex-military aircraft to be exported there.

The Portuguese government then sought to obtain the aircraft covertly and hired a European arms broker to purchase



Though marked as a civil aircraft, B-26B XB-PEK was operated as a VIP transport by the Fuerza Aérea Mexicana when this December 1963 photograph was taken at Mexico City. The aircraft bears the name *Sierra Hermosa* on its nose. Gary Kuhn

and export the aircraft by whatever means were necessary. The broker came to the United States and found a ready supplier at Tucson in the Aero Associates company. Both this company and its parent, Aero American, had shady involvement in a number of arms deals through the 1960s and was also the supplier of B-17s for the film *The War Lover* in 1961. There are some indications that Aero American was, at one time, a proprietary company for the CIA.

However, for the Portuguese arrangements, it appears that Aero Associates was acting independently. The company planned to purchase twenty surplus civil B-26s and have them overhauled at Hamilton Aircraft, located at Tucson Municipal Airport. Once ready for service, Aero Associates would deliver the aircraft, though the publicly announced destination was put variously as France or Saudi Arabia. In any event, a great deal of money changed hands, but only seven were ever delivered, and Hamilton Aircraft was left in the lurch when the deal fell apart.

The first two aircraft were successfully delivered to Portugal in June 1965, but with increasing questions from American customs officials, the next five were ostensibly sold to a Canadian buyer but were actually delivered to Portugal. In September 1965 the principals in the operation were all arrested in Florida, save the owner of Aero Associates who allegedly fled the United States with most of the money accrued through his dealings. They were charged with various felonies, with several unconvincingly claiming that the CIA was behind the operation. However, the charges were eventually dropped or, in several cases, the accused were tried and acquitted. In subsequent dealings Hamilton Aircraft offered to sell the remaining thirteen B-26s direct to Portugal with the State Department's blessing, provided that Portugal agreed not to use the aircraft outside the country. The restrictions and the offer of sale were rejected.

In any event, Portugal obtained seven B-26s in 1965 and assigned FAP serials between 7101 and 7107. Due to the negative publicity and international attention, the B-26s were not immediately deployed to Africa. Instead, they were based at Tancos in central Portugal and used for weapons trials. A single B-26 was deployed to Guiné in 1969, but was returned to Portugal shortly afterwards. It was not until late 1971 that six of the seven FAP B-26s were deployed to Angola to participate in the war. The Invaders were used in reconnaissance and close air support through 1974 in the deteriorating situation for Portugal. By 1975 all three colonies had been granted independence, but the situation in Angola quickly collapsed into a civil war that other nations, including Cuba, quickly joined. In November 1975 Portugal withdrew from Angola completely and the FAP left its six B-26s parked at Luanda. The fate of the aircraft has not been determined, but it is possible that one was exported to Cuba for display as a Cuban Air Force B-26. The seventh FAP B-26, s/n 7104, was grounded in 1965 and major components of it are reportedly held in storage for a museum at Alverca in Portugal.

Other Transfers: Nicaragua: Fuerza Aérea de Nicaragua (FAN)

The Nicaraguan government had agreed to assist the CIA and Cuban exiles in preparations for the Bay of Pigs invasion in April 1961, particularly by allowing the invasion air support to be based at a remote Nicaraguan airfield. In return, the CIA agreed to transfer any remaining B-26s left after the invasion to the FAN. By this method, the FAN obtained four 'sanitized' B-26s from the CIA in 1961, with the FAN assigning serials between 400 and 403 to the aircraft. The B-26s were assigned to a base at Las Mercedes near Managua.

In 1963 the FAN purchased two civil Invaders from an American source, the Maco Corp., to supplement their fleet, plus a third civil B-26 for use as a parts source. The two new B-26s were assigned the serials 420 and 422. The FAN B-26s were used to support Nicaraguan ground forces in counterinsurgency operations against the Sandanistas. Sometime around 1970 the remaining operational B-26s received serials 601 to 603, with the former parts source Invader being made airworthy. By 1976 all the B-26s had been withdrawn from service, and the following year four FAN B-26s were traded to David Tallichet, the operator of the Military Aircraft Restoration Corp, at Chino, California. Three of the four received American civil registrations, though only two were flown out of the country. A third was reportedly found unairworthy and remained at Las Mercedes. The fourth may have been taken by the Sandanista regime when it came to power in 1979. Its fate has not been determined, but a B-26 wearing ex-FAN colours and carrying the Fuerza Aérea Sandinista (FAS) serial of 368 was noted in derelict condition at Managua in 1990.

CHAPTER NINE

The CIA, the USAF and South-East Asia: Encore

After the Korean War ended in 1954, further front-line American service of the B-26 was largely confined to covert operations directed by the Central Intelligence Agency (CIA) or the US Air Force (USAF). Specifically, the CIA utilized B-26s for major covert operations in Indonesia in 1958, Cuba in 1961 and the Congo beginning in 1964. There were also numerous other smaller CIA operations undertaken with B-26s, including a civilian aircraft operated in Thailand and several B-26s transferred to Nationalist China. Invaders were operated by several proprietary front-organizations for the CIA and used for agent drops, mapping missions and unspecified covert activities in Latin America.

The USAF conducted covert operations with the B-26 in Laos and South Vietnam beginning in 1961. The last known USAF combat operations with the type was a mission flown on 10 November 1969, rounding out a combat record that provided the AAF and the USAF with a full twenty-five years of front-line service. As in the case of the B-26 in foreign service, the record of American covert use of the Invader has been exhaustively documented in the study by Hagedorn and Hellström; no attempt has been made to duplicate that impressive effort. However, a summary is presented.

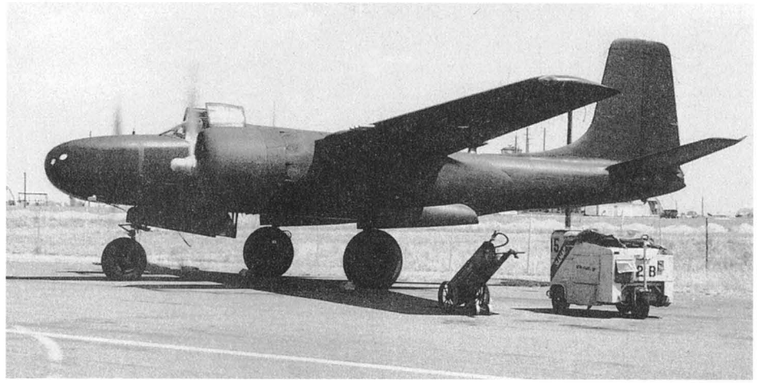
For American foreign policy planners attempting to exert a quiet influence in the brush wars common through the 1950s and the 1960s, the B-26 provided a weapon that was both capable but not overpowering. It became an ideal counterinsurgency (COIN) platform and was available in sufficient numbers from surplus stocks still held in storage. The CIA, as the main performer of covert operations for the United States, would come to love the supposedly obsolete B-26. The USAF, another instrument of foreign policy, was also called upon to conduct secret operations using covert B-26 fleets in south-east Asia.

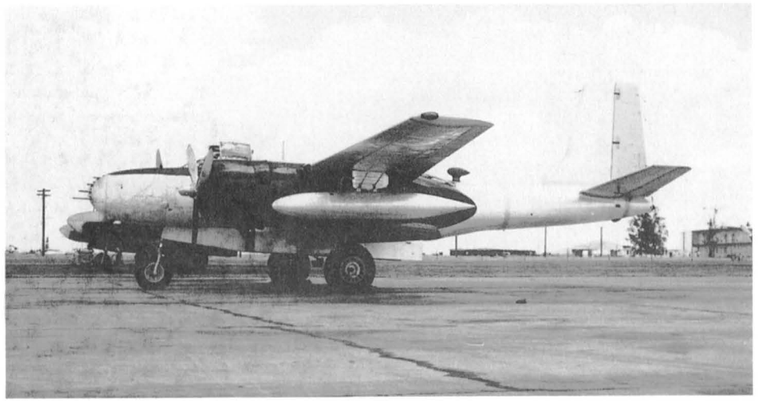
Indonesia

While there is little doubt that the CIA dabbled in providing or operating B-26s in earlier years, the Indonesian civil war in 1958 saw the first offensive use of the type by the agency. Indonesia had become a fractured nation after independence from the Dutch was won in 1949. The American government perceived a Communist leaning by the Indonesian government in the mid-1950s. By 1957 a decision had been taken to assist opposition forces covertly to topple the established government. As part of the assistance, the CIA began to assemble a small cadre of B-26s and flight crews to provide air support to rebel forces. In February 1958 three stored B-26s were pulled from a scrapyard at Clark AB and rejuvenated for operations. Civil American flight crews, primarily veterans of other CIA activities, were recruited. These aircraft deployed from the Philippines to rebel air bases in early April 1958 and flew their first sorties on 13 April against government forces. Four additional B-26s were soon prepared at Clark Field, as were a number of F-51D Mustangs. Six more B-26s were prepared in May and one was deployed shortly thereafter. Five aircraft were held in reserve at Clark AB, for a total of thirteen aircraft assigned to the operation.

On 18 May 1958 a B-26 operated by a CIA contract pilot was shot down by an Indonesian F-51 during an attack near Ambon. Both crew members were captured and any covert nature of the rebel support soon unravelled. The pilot, Allen Pope, was quickly linked to the CIA and the United States, in a fit of

This B-26B, reported to be s/n 44-34376, was one of three Invaders used by the CIA to support Indonesian rebels beginning in April 1958. These aircraft were drawn from USAF stocks at Clark AB, overhauled and placed in readiness with the CIA in late 1957. This aircraft is overall dull black with no markings in this March 1958 view at Clark AB. At this point it carries internal wing guns but no nose guns. This aircraft survived the Indonesian operation and went on to be used by the USAF in its covert war in Vietnam in 1963. Lionel Paul Collection





One of a later batch of three CIA B-26s committed to support the Indonesian rebels in May 1958. This aircraft, also unmarked but finished in overall silver, is believed to be s/n 44-35221. If so, this is the aircraft that was shot down by the Indonesian military on 18 May 1958, an event that caused the whole CIA operation to unravel. Lionel Paul Collection

embarrassment, terminated its support of the rebel air force. Several of the B-26s were reportedly flown back to Clark, while any remaining aircraft in Indonesia were probably destroyed on the ground as the operation ended. Pope, meanwhile, was tried and convicted by the Indonesian government, spent four years in jail and was subsequently released.

The Bay of Pigs

Of all the covert operations conducted by the CIA with the B-26, the Bay of Pigs fiasco is the most notorious. Approximately twenty aircraft were assembled by the CIA and deployed to Nicaragua. Cuban flight crews, trained earlier by detached Alabama ANG instructors in Guatemala using MDAP-supplied aircraft, conducted air support operations of an amphibious invasion of Cuba in mid-April 1961. As the invasion began to falter, American crews flew sorties in an unsuccessful effort to tip the balance.

The seeds for the American-instigated invasion of Cuba by Cuban exiles had sprouted by the fall of 1960 within the CIA and at the highest levels of government. Initially, planners expected to provide air support using F-51 Mustangs or F4U Corsairs. However, the lack of experience in high-performance fighters by the available Cuban pilots and the range required to conduct operations from bases in Central America made the B-26 an obvious choice. In addition, as the plan evolved, the Invaders could be deceptively marked as Cuban Fuerza Aérea Revolucionaria (FAR) B-26s and suggest that a coup against Castro had precipitated the invasion.

As noted in Chapter 8, the CIA was able to expedite the sale of eight B-26s for use with the Fuerza Aérea Guatemalteca (FAG) in the summer of 1960, six of which were immediately pressed into service at a remote base to train Cuban exile pilots for action. The base, located near the city of Retalhuleu, was constructed in the late summer of 1960 and consisted of a 4,800ft (1,460m) paved runway with a few buildings and barracks.



Two B-26s were delivered by the CIA to the Indonesian rebels to provide a parts source. They sported an unusual camouflage scheme with black upper surfaces and green splotches over a natural metal finish on the lower surfaces. This aircraft is shown at Clark AB on 6 May 1958, shortly before being flown to Indonesia. Both aircraft are believed to have been abandoned in Indonesia in 1958.
Lionel Paul Collection

Known as Rayo Base by the exiles, it was officially a Guatemalan air base and the B-26s were marked as FAG aircraft, even though the CIA ran the base and its pilots trained the Cubans. The base itself was supplied by Douglas C-54s flying nightly from south Florida airfields.

Approximately eighty volunteers, mostly veterans of the Alabama Air National Guard (ANG), but also coming from other sources, were detached for service and sent south to work for the CIA. The personnel of the Alabama ANG included instructors and mechanics. Evidently, most of the B-26s planned for use in the operation also staged through Retalhuleu, as accounts indicate that two of the B-26s were damaged in training accidents. However, by March 1961 the CIA and the Cubans were moved to bases in Nicaragua as preparations for the invasion were finalized and the base at Retalhuleu and the borrowed FAG B-26s were finally released to the Guatemalans.

Some seventeen B-26s, drawn from USAF stocks in storage at Davis-Monthan AFB, were staged into a CIA–borrowed base, otherwise known as Happy Valley, at Puerto Cabezas in Nicaragua in March 1961. This group of B-26s had been purchased by a CIA proprietary company, Intermountain

Aviation, for another CIA company, the Caribbean Marine Aero Corp., all with the intent of providing a means of plausible denial. Most of the aircraft gained fictitious FAR paint schemes and markings and had FAR serials added that duplicated those assigned to actual FAR B-26s. Another bogus FAR B-26, carrying the serial of FAR 933, was used to create the impression that a coup of sorts was under way in Cuba. The B-26 arrived at the Miami International Airport on the morning of 15 April 1961, the apparent victim of battle damage over Cuba as it landed with one propeller feathered and bullet holes spread over the tail section. The pilot claimed that he had defected from the FAR and had strafed and bombed Cuban targets on his way out of Cuba but, of course, he was actually an exile flying one of the CIA B-26s.

On the morning of 15 April the B-26s began operational missions from Happy Valley, flying the 700miles plus (say 1,150km) from Nicaragua to the initial Cuban targets, primarily airfields. Only eight of the aircraft were assigned to missions on the first day, limiting the effectiveness of the attacks and possibly dooming the entire operation. The half-hearted effort quickly became indicative of the American commitment to the exiles' invasion.

Over the next five days pitched air battles saw CIA 'liberation' B-26s engage FAR B-26s, T-33s and Sea Furies, while the CIA aircraft tried to defend the amphibious landings under way at the Bay of Pigs. The real FAR enjoyed moderate success in sinking and disrupting the landing efforts, despite the best efforts of the exiled B-26 crews. The fact that all the B-26s operating over Cuba, both friend and foe, were marked as FAR aircraft no doubt caused much confusion and some of the fake FAR B-26s reportedly had their marking removed.

A total of eight 'liberation' B-26s were lost during the operation, with five shot down by FAR T-33s, two by FAR Sea Furies and one by ground fire. As American enthusiasm for the invasion wilted, the close air support of the amphibious forces became less and less effective. The FAR soon held air superiority over the beaches and the invasion faltered. Some of the American advisers in Nicaragua were not content to abandon the air support mission and flew several desperate combat sorties themselves, with the loss of two B-26s and their two-man American crews. Within days the liberation forces had been hastily withdrawn or forced to surrender in Cuba. The surviving liberation B-26s were gathered at Puerto Cabezas in Nicaragua. The American and the Cuban personnel in Nicaragua were pulled back to the United States, leaving the aircraft behind. Some were eventually turned over to the Nicaraguan government while others evidently returned to official American jurisdiction. The whole episode was an embarrassing failure to the new administration of President Kennedy and to the efforts of American foreign policy in general.

Laos

At the same time as the CIA was immersed in preparations for the invasion of Cuba, the agency was also organizing a small force of covert B-26s for the deteriorating situation in Laos. By 1961 there were several divergent political forces trying to control Laos and the USA had allied itself with the so-called royalist forces and Meo tribes against the Communist Pathet Lao (receiving support from the Soviet Union and North Vietnam). The USAF and the CIA created a plan for a modest unit of approximately twenty B-26s to be stationed at the Royal Thai Air Base at Takhli in central Thailand. The aircraft would be flown and supported by recently discharged USAF personnel on the payroll of the CIA. Most of the B-26s were from a group at Davis-Monthan AFB slated for scrapping, though several apparently came from CIA sources in the Philippines and Taiwan. By the late spring of 1961 the project, dubbed Mill Pond, was in place at Takhli under the direct control of CIA headquarters in Washington, DC. The B-26s at Takhli carried no markings nor serial numbers and had been stripped of any identification before arriving in Thailand (*see* Table).

Under the pressure of a Pathet Lao offensive in mid-April 1961, the unit was ordered into action with air strikes against the Communist forces on the Plain of Jars in Laos. However, the memory of the excruciating failure at the Bay of Pigs apparently caused second thoughts in Washington and the strikes were called off. The *Mill Pond* B-26s remained based at Takhli, but never flew an offensive combat sortie in Laos. Instead, the mission turned to one of reconnaissance. Two RB-26Cs were added to the *Mill Pond* force and, by late April 1961, armed reconnaissance missions were being flown over Laos. In late May a ceasefire was negotiated in Laos and the reconnaissance missions ceased.

The *Mill Pond* B-26s remained based in Thailand as a contingency against renewed fighting in Laos. In mid-August 1961, however, the American ambassador in Thailand discovered that the CIA was operating a force of B-26s in the country without his knowledge and requested that they be deployed elsewhere. Within a week the B-26s had been dispersed to bases in Okinawa and the project was terminated.

Mill Pond B-26s

USAF s/n	Version	Remarks
44-34361	B-26B	to B-26K
44-34681	B-26B	to Farm Gate
44-34718	RB-26L	to Farm Gate
44-35322	B-26B	to B-26K
44-35335	B-26B	to Farm Gate
44-35435	B-26B	to B-26K
44-35448	B-26B	
44-35507	B-26B	to Farm Gate
44-35513	B-26B	
44-35514	B-26B	to Farm Gate
44-35530	B-26B	to Farm Gate
44-35546	B-26B	to B-26K
44-35585	RB-26C	to Farm Gate
44-35663	B-26B	to Farm Gate
44-35692	B-26B	to Farm Gate
44-35703	B-26B	to Farm Gate
44-35804	B-26B	to Farm Gate
44-35813	RB-26C	to Farm Gate
44-35822	B-26B	to Farm Gate
44-35855	B-26B	to Farm Gate
44-35890	B-26B	to Farm Gate
44-35912	B-26B	scrapped at Taipei

Vietnam

As the situation in Laos deteriorated, so it did in South Vietnam. The French collapse in 1954 and the subsequent Geneva Accords effectively divided Vietnam into two countries. By 1960 the unstable and unpopular government of South Vietnam came under increasing pressure from the insurgent Communist forces known as the Viet Cong, which began receiving direct support from North Vietnam. The United States

The Blue Goose and Steel Tiger

The author, Frank Bonansinga, was an Air America pilot who flew a unique civil B-26 on night drop missions from Thailand into Laos during the covert war being fought in 1967. Bonansinga had flown corporate B-26s for Raytheon between 1955 and 1965 from Hanscom Field, Bedford, Massachusetts. He was recruited by Air America in July 1965 and flew Twin Beeches from Saigon before moving to Udorn, Thailand, to fly specially modified Volpar Twin Beeches and the Air America B-26.

A dark blue, long-nosed, twin-engined airplane showed up at the Air America ramp at Udorn, Thailand, in May 1967. It was to make night drops to supply infiltrated indigenous troops in unfriendly territory. These surveillance teams operated between the Mu Gia Pass to Tchepone in east central Laos. This area, with its jagged hills (called karsts), had a network of roads from North Vietnam snaking in and out of the jungle cover toward South Vietnam. The roads were referred to as the Ho Chi Minh Trail and the area was codenamed *Steel Tiger*. The sleek machine was a modified Douglas B-26 Invader.

This Air America B-26, assigned the American civil registration of N46598, was painted blue with white trim stripes and nicknamed the *Blue Goose*. It was also affectionately referred to as the Blivit, which implied something stuffed full of more than it could hold. This was true, as it had everything from A to Z when it came to equipment and then some!

The *Blue Goose* was considerably different from the World War II Douglas A-26 Invader. This hybrid B-26 arrived with many of the modifications taken from the On Mark corporate Marketeer and a few from the On Mark USAF B–26Ks then based at Nakhon Phanom in eastern Thailand.

The similar modifications consisted of wing tip tanks; co-pilot instruments and controls; an enlarged rudder for better control; oversized anti-skid brakes; and an air stair door on the starboard side. The engines had reversible props and with water injection and each gave R-2800 2500 horsepower on take-off. Also, our *Blue Goose* had the bomb bay doors sealed and the addition of large couch with several seats as in the corporate *Marketeer* modification.

The paramount changes featured in this B-26 were Terrain Following Radar (TFR); precise navigational gear and a cargo drop ramp. These additions enabled '598' to deliver supplies at night, at low-level and in almost any kind of weather. The TFR was new at the time. In fact, the only other aircraft to have it was the new USAF F-111, an all-weather fighter-bomber not yet deployed to Southeast Asia. Installed in the B-26 nose, this unique radar enabled it to fly low at night over any terrain getting to the drop area and away from it as quickly as possible. The autopilot could be coupled to the TFR and the navigational equipment was checked before and after each flight with exceptionally accurate results.

The other major feature in Air America's B-26 was its cargo drop ramp, similar to that in the C-123 and Caribou aircraft, but much smaller. A pallet of approximately 500 pounds [230kg] of supplies was pushed out of the B-26's cargo ramp by the Air Freight Specialist (AFS) or, as commonly called, the kicker.

The B-26's forward wing spar still ran through the fuselage causing the three-man cockpit crew to crawl under the large carry-through structure to enter the cockpit from the cabin. This made hasty egress via the cabin impossible. Also, the cockpit hatch couldn't be used for bailing out without the high probability of hitting the wing root or the tail section. Thus, parachutes were sat on and seldom hooked up, except by the kicker.

Navigational equipment, besides the radar and computer, was a military-type TACAN, an ADF and the VOR/ILS receiver. Communication gear was UHF, VHF and HF radios, an IFF encoder, a radar altimeter and one black box in the center console, its use never explained and never used.

The navigator was stationed behind the pilots with his table and chair where he operated the navigational equipment and radar. Besides this important job, he helped spot the drop zone (DZ) lights on final run in to the drop site.

The typical mission was to supply the surveillance teams with food, 'hard rice' (ammo) and whatever they required. A road watch team, 'Stag' and 'Quail' were two codenames remembered, would radio in their needs, giving a drop zone location and receive an agreed-upon drop time and signal, usually a 'T' or 'L' made with flashlights. The DZ signal was turned on just prior to the expected drop time or when the B-26 was heard. There was no communication between the team and the *Blue Goose*, so if no signal was seen, it was a no drop. And, only one pass to the DZ co-ordinates was made.

At Udorn, the aircraft was normally towed to the customer's warehouse for loading and briefing. The kicker supervised the loading while the navigator and pilots figured the flight plan, usually departing Udorn after dark. The flight called for the plane to descend to a low altitude entering the *Steel Tiger* after crossing the Mekong River into Laos.

We'd hit an initial point at seven or so miles from the DZ, slow to approximately 140 knots [260km/h] and the kicker lowered the ramp. After the DZ lights were spotted and load dropped, we headed back to Udorn or sometimes to Savannakhet to reload for a different DZ.

Air America had excellent, if not the best, maintenance in Southeast Asia and this was particularly true at Udorn. None the less, problems occurred as in all machines. Several inflight engine shut downs and an electrical fire are well remembered. Another time, a load got off the tracks and the kicker somehow managed to kick it out and kept from going with it.

A view of the On Mark B-26 used by Air America in 1967 for air drops of matériel to Laotian forces. Operating from Udorn AB in Thailand, this civil-registered B-26 was used through October 1967 and was modified to allow small cargo pallets to be dropped from a ramp located behind the former bomb bay area. Frank Bonansinga



The Blue Goose and Steel Tiger *continued*

The B-26 was similar to dropping in Air America's other aircraft except for two problems. First, it was too fast, with a minimum drop speed of 140 knots compared to 122 knots [226km/h] in a lighter A-26 Invader. This minimum safe control speed, if an engine failed, was higher than most of our other drop machines and cut down the maneuvering or line-up time once the DZ lights were spotted. The other major problem was seeing out the cockpit to drop. The pilot's forward vision was hindered by the *Blue Goose's* nose. Once the DZ was spotted, a slightly curved approach in a left turn was required to keep the DZ lights in sight and make a successful drop.

Darkness was not a factor in the project's outcome. But a DZ surrounded by high jungle cover could pose a problem when coming in low for drops. We did have a couple of missions where no DZ lights were displayed; it's likely the night watch team had more steel than tigers to worry about in the unfriendly *Steel Tiger*. Our last night drop mission was made on the night of October 7, 1967. Shortly thereafter the project was canceled. The results indicated the other Air America aircraft at Udorn could do the job better than the *Blue Goose*.

The *Blue Goose* was one going machine and I enjoyed flying it. The night drop missions were always interesting. But that one black, super-secret, box will forever remain a mystery. Probably was a fax machine!

provided a Military Assistance Advisory Group to the government of South Vietnam in an effort to counter the Viet Cong. Though limited to 685 personnel, the new Kennedy administration initially supported additional covert assistance. Soon additional advisers were deployed to help the military forces of South Vietnam.

In the fall of 1961 elements of the 4400th Combat Crew Training Squadron (CCTS), based at Hurlburt Field, Eglin AFB, Florida, had been deployed to Bien Hoa AB near Saigon. This unit, codenamed *Jungle Jim*, had been formed in April 1961 to provide COIN capability for the USAF. Aircraft assigned to the unit included T-28s, C-47s and about a dozen B-26s. The last were part of a group of twenty-seven withdrawn from storage at Davis-Monthan AFB and refurbished at Hill AFB. The first deployment to Bien Hoa included only four SC-47s and eight T-28s, as the B-26s were not yet available. However, four B-26s already in the region, most likely veterans of the *Mill Pond* unit, were assigned to the 4400th CCTS. The Vietnam detachment of the unit received the project name of *Farm Gate* (*see* Table).

The announced mission of the detachment was to train personnel of the South Vietnamese Air Force to conduct COIN operations. The actual mission was to provide close air support to South Vietnamese ground forces and attack Viet Cong positions. In order to maintain a low profile and avoid acknowledging that the USAF was flying combat missions in Vietnam, the *Farm Gate* aircraft were marked with South Vietnamese insignia, though they retained their USAF serials and were operated by USAF crews. To further the 'training' appearance, it was mandated that all aircraft employed operationally would have token Vietnamese crew members on board, though there was little, if any, training performed.

By early 1962 the 4400th CCTS, adopting the name 'Air Commandos', was conducting regular sorties against Viet Cong targets in South Vietnam. In March 1962 the unit, still headquartered at

Farm Gate B-26s

USAF s/n	Version	Remarks
44-34376	B-26B	scrapped at Clark AB
44-35359	B-26B	scrapped at Clark AB
44-34551	B-26B	scrapped at Clark AB
44-34620	B-26B	scrapped at Clark AB
44-34681	B-26B	lost August 1963
44-34682	B-26B	lost September 1963
44-34718	RB-26L	scrapped at Hill AFB
44-35207	B-26B	lost January 1964
44-35335	B-26B	withdrawn November 1963
44-35507	B-26B	lost February 1963
44-35514	B-26B	scrapped at Clark AB
44-35525	B-26B	lost April 1963
44-35530	B-26B	lost November 1962
44-35566	B-26B	withdrawn January 1964
44-35585	RB-26C	scrapped at Clark AB
44-35663	B-26B	scrapped at Clark AB
44-35692	B-26B	lost February 1963
44-35703	B-26B	possibly to Congo
44-35782	RB-26L	withdrawn at Tainan (Taiwan), December 1963
44-35804	B-26B	possibly to Congo
44-35813	RB-26C	scrapped at Hill AFB
44-35822	B-26B	possibly to Congo
44-35855	B-26B	scrapped at Clark AB
44-35890	B-26B	to Congo
44-35912	B-26B	scrapped at Taipei



Project *Farm Gate* provided nearly two dozen B-26 to, supposedly, the South Vietnamese Air Force to support the counter-insurgency effort in 1963. In fact, USAF crews operated the Invaders, though they were marked with SVAF insignia. Operating from Bien Hoa, these aircraft remained in service through 1964 when, due to structural failures, they were withdrawn and placed in storage at Clark AB. This view shows a line of the Farm Gate B-26s at Clark in 1964. Most were eventually scrapped on location. Roger Besecker Collection



This was the condition of most of the *Farm Gate* B-26s at Clark Field by late 1964. Many still retained their SVAF colours. Dave Menard

Hurlburt Field, was redesignated as the 4400th Combat Crew Training Group. In April 1962 with the pretence of its training role slipping away, the unit became the 1st Air Commando Group (ACG), with *Farm Gate* remaining as Detachment 2A of the ACG.

Later that same month, the two RB-26Cs formerly assigned to *Mill Pond* and occasionally based at Takhli in Thailand, were assigned to *Farm Gate* at Bien Hoa for continued reconnaissance missions over Laos and to conduct mapping surveys of South Vietnam. At some point these aircraft also gained South Vietnamese markings.

Through 1962 the *Farm Gate* detachment pressed home its attacks against Viet Cong positions and lost two T-28s and one B-26, with another two B-26s severely damaged. Many of the B-26 sorties were flown at night in support of South Vietnamese outposts.

In early 1963 another eleven B-26s were assigned to the detachment, these mostly being freshly overhauled machines arriving from Hill AFB. However, two of the Invaders were RB-26Ls – specially modified aircraft fitted for night-time reconnaissance. These two aircraft, B-26B s/n 44-34718 and B-26C s/n 44-35782, had been modified by General Dynamics and E-Systems in Greenville, Texas, in 1962. Besides the normal complement of cameras, the two RB-26Ls were equipped with a Reconofax VI infra-red aerial mapping system. The RB-26Ls were quickly pressed into service, being among the few resources available to conduct the crucial night missions. However, accounts suggest that the equipment did not prove reliable in the combat environment. A third RB-26L remained based at Eglin AFB.

By April 1963 there were twelve B-26Bs and two RB-26Ls assigned to *Farm Gate*, in addition to the T-28s and the SC-47s. Two of the B-26s had been shot down in February 1963 but these were replaced when another four were assigned in mid-1963. These B-26s reportedly arrived from Clark AB and Taiwan where they had been held in storage after the 1958 abortive CIA effort in Indonesia. Thus, at its peak, the *Farm Gate* detachment counted eighteen B-26s or RB-26s in service. At the same time the pretext of the South Vietnamese training mission was dropped and the *Farm Gate* detachment was reformed as the 1st Air Commando Squadron (Composite) of the 34th Tactical Group. Subsequently, USAF insignia replaced the South Vietnamese markings on many of the unit's aircraft. The USAF crews now openly flew support missions in the T-28s and B-26s.

Concerns were raised in August 1963 when a B-26 lost a wing during a pull-out after a diving attack, with the loss of two USAF and one SVNAF crew members. The tired airframes were subjected to excessive stresses by the under-wing loads being carried and the high g forces imposed by the tactics being used. After the August loss the B-26 was restricted to a more gentle attack profile in an attempt to limit the load stresses. However, in February 1964 a B-26 performing a demonstration strafing attack at Eglin AFB also lost its wing during the pull-out manoeuvre, with the loss of both crew members. After the second structural failure, the remaining B-26s in combat operations were withdrawn from service and parked. The thirteen surviving aircraft were flown from Bien Hoa to Clark AB in April 1964 and placed in storage. Four of them were transferred in late 1964 for operations by Cuban pilots in the Congo conflict. Most of the other B-26s were scrapped on site at Clark AB in late 1964 and early 1965. The B-26 would not be seen in operational service in south-east Asia again until the new B-26Ks were deployed to Thailand in May 1966.



Another view of the *Farm Gate* B-26s in storage at Clark AB after being withdrawn in April 1964. This aircraft is s/n 44-35663 and may have participated earlier in Operation *Mill Pond* in Laos in 1961. Roger Besecker Collection

The B-26K Counter Invader

Clearly demonstrated by the covert employment of the B-26 by the USA in the late 1950s and the early 1960s, USAF planners recognized the unique utility of the outdated bomber in the limited counterinsurgency wars becoming prevalent in the East–West conflict. Unfortunately, the age and availability of the type proved to be a big drawback for wider use, as were the varying configurations of the modified and remodified aircraft available in the Davis-Monthan scrapyard and from other USAF sources. Airframe fatigue proved to be the critical problem, as wing spar and other structural cracks had appeared in dozens of B-26s in service with the USAF and foreign air forces. The several efforts made to reinforce the wing spars met with limited success, but it was clear by 1962 that a programme to remanufacture and standardize the B-26 would provide an effective and low-cost COIN weapon.

The On Mark Engineering Co. at Van Nuys, California, had become one of the primary sources of improvements and updates for the basic B-26 design (see also Chapter 10). Beginning in the mid-1950s, the company had developed a series of modifications that were applied to civil-operated B-26s, by then becoming popular as fast executive transports. These modifications included, among others, higher-powered versions of the R-2800 engine, new propellers with reversing capability, wing-tip fuel tanks, improved wing spars, remanufactured fuselages and



The prototype On Mark YB-26K Counter Invader, s/n 44-35634, on the ramp at the Van Nuys airport, probably in mid-1963. The B-26K utilized a number of the civil On Mark modifications such as wing-tip tanks, upgraded engines and propellers and wing improvements. After this aircraft was tested, it was modified to the B-26K standard and redelivered as s/n 64-17670. USAF

A total of forty B-26s were rebuilt by On Mark to be redelivered, with new USAF serial numbers, as B-26Ks between May 1964 and April 1965. This view shows B-26K s/n 64-17672 at delivery. The unusual paint scheme was soon changed to the standard south-east Asia three-tone scheme. Roger Besecker via AAHS



updated avionics. Each of these modifications had been engineered, built, installed and tested by On Mark and approved for installation on civil aircraft by the Civil Aviation Administration or its successor, the Federal Aviation Agency (FAA).

With On Mark already possessing the engineering knowledge needed, the USAF Special Air Warfare Center requested that the company develop an updated B-26 prototype, applying many of the modifications already used on civil Invaders and develop new ones to meet military requirements. In October 1962 the USAF delivered RB-26C s/n 44-35634 to On Mark at Van Nuys. Over the next five months On Mark rebuilt the aircraft, redelivering it to the USAF in February 1963 as the sole YB-26K. The airframe was remanufactured, strengthening or replacing fatigued components. The wing was completely broken apart and rebuilt with reinforced spars and spar straps added for additional strength. Pratt & Whitney R-2800-103W engines with water injection, offering 2,500 horsepower, were fitted with fully-reversible, square-tipped Hamilton Standard propellers with automatic feathering. The landing gear was strengthened and the wheels and brakes replaced with KC-135 assemblies. Nose wheel steering was added, replacing the castering system of the original aeroplane. The tail section was rebuilt with a larger rudder. Engine fire extinguishers, anti-ice provisions and a higher-capacity electrical system were all added. The internal fuel capacity was increased to 1,230gal (4,660ltr), including that carried in permanently mounted 165gal (625ltr) wing-tip fuel tanks. An additional 1,135gal (4,300ltr) of fuel could be carried for ferrying purposes in under-wing drop tanks and an additional bomb bay tank. Dual controls were installed in the cockpit with a standard layout established. Provisions for jet-assisted take-off (JATO) bottle attachments were added to enhance short-field take-off performance. A wide range of modern avionics were provided, including UHF, VHF and HF radios for communications and navigation.

For armament, the prototype retained the eight-gun all-purpose nose and the six internal wing guns. As on the standard B-26, the gun nose could be replaced with a standard bombardier nose. The remote turrets and associated equipment were all deleted. Eight under-wing hard points were added, each capable of carrying a variety of fuel tanks, bombs, rockets, napalm or other munitions. The internal bomb bay could carry up to 4,000lb (1,820kg) of ordinance, while the under-wing load was increased to 8,000lb (3,630kg). Maximum authorized disposable load was limited to 11,000lb (5,000kg).

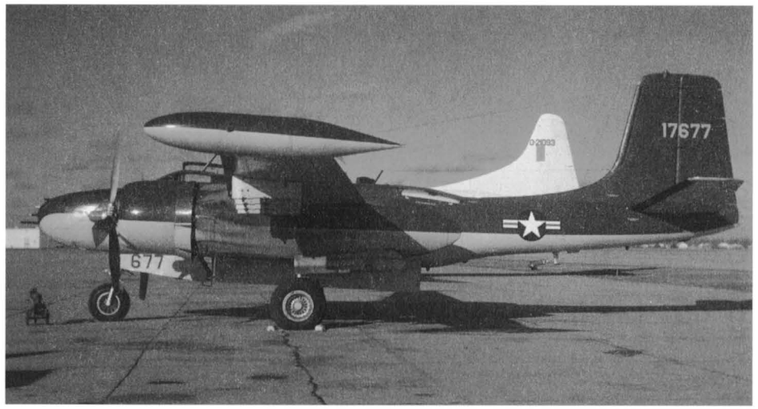
The YB-26K, which retained its original USAF s/n of 44-35634, first flew from Van Nuys on 28 January 1963. Over the next few months, it was evaluated by the USAF at nearby Edwards AFB. An FAA test pilot put it through its paces at Edwards, with the FAA presumably involved in the programme for possible civil certification or evaluation of the additional modifications. On 1 June 1963 the YB-26K was assigned to the 1st ACW at Hurlburt Field for evaluation at the Special Air Warfare Center. The aircraft demonstrated JATO take-offs and the delivery of a variety of ordinance loads. Satisfied with the results, the USAF placed a $13 million contract with On Mark in October 1963 to produce forty B-26Ks, assigning new FY 1964 serials between 64-17640 and 64-176799 to the remanufactured aircraft. The USAF allocated twenty-seven stored and thirteen Tactical Air Command B-26s for the conversions, the On Mark order being placed six months before the USAF grounded all of the old B-26s.

The specifications for the B-26Ks (see Table) differed from that of the YB-26K in having the JATO provisions, nose wheel steering, cockpit air conditioning, engine-fire detection system and wing-mounted machine guns all deleted. It was decided to use under-wing gun packages if needed. Pratt & Whitney R-2800-52W engines, also of 2,500 horsepower, were fitted instead of the -103Ws. The maximum gross weight was pegged at 43,380lb (19,700kg), some 7,000lb (3,200kg) heavier than a standard B-26. The maximum ferry range was calculated at 3,250 nautical miles (6,020km). The maximum speed was established at 375 knots indicated airspeed (700km/h).

B-26s were ferried in to the On Mark facility at Van Nuys where a B-26 production line was established. Over the span of the subsequent eighteen months, forty B-26Ks were produced, including the original YB-26K being completed as a B-26K. The first model rolled off the production line on 20 May 1964, its first flight taking place five days later with delivery to the USAF on 15 June. The first and the second B-26K were flown to Edwards AFB, California, for testing, while the third went to the 1st ACG at Hurlburt Field. Production continued at the rate of four per month through 1964 until production was completed on 14 April 1965.

Another component of the B-26K programme was the development and production of a bomb bay

B-26K s/n 64-17677 at Clark AB in November 1965. The B-26Ks were redesignated as A-26As in early 1966 when the 603rd Air Commando Squadron deployed to Thailand for covert operations over Laos. This aircraft was transferred to South Vietnam in November 1969 as an instructional airframe and may still exist.
S.H. Miller via Dave Menard



On Mark Engineering Co. B-26Ks

New USAF s/n	From	Remarks
44-35634	—	YB-26K, to B-26K 64-17670
64-17640	44-35896	to N267G, N2294B
64-17641	44-35322	Steel Tiger; lost 12/67
64-17642	44-35435	Steel Tiger; lost 8/67
64-17643	44-35392	Steel Tiger; lost 7/66
64-17644	44-35451	Steel Tiger; to South Vietnam
64-17645	44-35546	Steel Tiger; to South Vietnam
64-17646	44-35375	Steel Tiger; lost 7/69
64-17647	44-35904	scrapped 12/72
64-17648	43-22732	Steel Tiger; lost 5/68
64-17649	43-22720	Steel Tiger; scrapped 12/72
64-17650	44-35766	Steel Tiger; lost 6/66
64-17651	44-34119	Steel Tiger; to display in Korean museum
64-17652	44-34361	Steel Tiger; to South Vietnam
64-17653	41-39378	Steel Tiger; to display in Pima Air Museum, AZ
64-17654	41-39491	Steel Tiger; to South Vietnam
64-17655	44-34184	scrapped 12/72
64-17656	44-35847	accident 12/64
64-17657	43-22649	to N62104, N99218
64-17658	44-35685	scrapped 12/72
64-17659	41-39564	accident 8/65
64-17660	44-35608	Steel Tiger; scrapped 12/72
64-17661	44-35433	Steel Tiger; scrapped 12/72
64-17662	44-35458?	or 41-39462?; Steel Tiger; lost 8/67
64-17663	41-39462	or 44-35458? Accident 4/65
64-17664	43-22665	Steel Tiger; scrapped 12/72
64-17665	44-34145	Steel Tiger; scrapped 12/72
64-17666	44-35483	Steel Tiger; to display at Hurlburt Field, FL
64-17667	44-35468	Steel Tiger; lost 3/69
64-17668	44-34652	Steel Tiger; lost 2/67
64-17669	44-34606	Steel Tiger; lost 2/67
64-17670	44-35634	from YB-26K; Steel Tiger; scrapped 2/72
64-17671	44-35820	Steel Tiger; to display at Florence, SC museum
64-17672	44-35251	Steel Tiger; lost 12/66
64-17673	44-34135	Steel Tiger; lost 3/69
64-17674	41-39573	accident 1/69
64-17675	44-34173	Steel Tiger; scrapped 12/72
64-17676	41-39596	Steel Tiger; to N268G, C-GXTF, N22939, to display in USAF Museum, Dayton, OH
64-17677	44-34108	or 44-35205?; Steel Tiger; to South Vietnam
64-17678	44-35205	Or 44-34108?; Steel Tiger; scrapped 12/72
64-17679	44-34198	to N269G, C-GXTG, N4988N

reconnaissance package by Fairchild Camera and Instrument Corp. of Syosett, New York. This package, ten of which were ultimately produced, utilized off-the-shelf cameras and other equipment, including one KA-56A 3in vertical, low-altitude panorama camera, a KA-2 night/day camera, an intervalometer, C-1 flash detector and B-4 or A-6 flash bomb ejectors. The package was custom-fitted to the B-26K bomb bay and was designed to be capable of being installed within a few hours. A bombardier nose could also be installed that would mount a K-38 oblique camera in the nose station. The reconnaissance system project manager explained the reason for older, off-the shelf components for the package: 'We're matching the compatibility of the cameras with the capability of the aircraft. It's like a Model A Ford – there's no point in installing a 300 horsepower Cadillac engine in it.'[132]

Two other conversion kits were also developed for the B-26K. One was a cargo pallet with a four-point hoist system for the bomb bay, allowing 5,000lb (2,300kg) of cargo to be carried. Eight seats could be fitted to provide passenger transport or medical evacuation capability.

The B-26Ks were delivered to the USAF in a two-tone green and grey glossy paint scheme with a sharp demarcation line between the two colours. The USAF quickly replaced this by a Vietnam-era, three-tone, flat camouflage scheme with two shades of green and one of tan, plus undersurfaces of grey or black. The national insignia were minimized or, for those aircraft going to Thailand, eliminated altogether. Serial numbers and other markings were usually applied in flat black.

The USAF grounded all the old B-26s in February 1964. The deteriorating situation in Africa demanded that the fifth, sixth and seventh B-26Ks be flown direct to the Congo for use by a small CIA covert air force. Otherwise, most of the new B-26Ks were eventually delivered to the 1st ACW at Hurlburt Field or to the 605th ACS at Howard AFB, Panama Canal Zone. As the A-1 Skyraiders with Detachment Two of the 1st ACW were enjoying success, there was no pressing need to send the new B-26Ks to south-east Asia. However, in the spring of 1966 and within a year of the last B-26K delivery, eight B-26Ks were deployed to Nakhon Phanom in Thailand, at which time all of the B-26Ks were redesignated as A-26As to satisfy Thai government requirements.

The A-26As served in Thailand between May 1966 and November 1969, after which the surviving aircraft were flown to Clark AB for disposition. Five were turned over to South Vietnam for use as instructional airframes, those being flown to Nha Trang AB. They were still at Nha Trang in May 1975 as South Vietnam collapsed and rendered unairworthy. The remains of the A-26s may still be at Nha Trang. The other A-26As were flown to Davis-Monthan AFB for storage where they joined the remaining USAF inventory of B-26s. One was flown on to Hurlburt Field for eventual display and one ended in a South Korean air museum. All but ten A-26As were immediately deleted from the USAF inventory. Ten were held in storage until late 1972 for possible use when they also were declared excess. Most were scrapped soon afterwards but a few were sold and entered the American civil register.





Above: **One of the A-26As in service, probably at Nakhon Phanom, Thailand. The A-26As, as part of Operation *Steel Tiger*, usually used the call sign 'Nimrod' during combat.** Boeing Historical Archives

Left: **Surviving A-26As were mostly withdrawn from service in late 1969. Some remained on the USAF inventory in storage until 1972, but many were scrapped or released for surplus sale. This example, s/n 64-17653, ended at the Pima Air Museum near Davis-Monthan AFB, Arizona. This view shows the aircraft in November 1982.** Scott Thompson

The Congo

After the Belgian government granted independence to its Congo colony in June 1960, the new nation plunged into chaos and civil war. Through the early 1960s the political turmoil left a central government pitted against rebellion forces composed of, among other factions, leftist liberation groups. By 1964 the USA was committed to assist the central government in maintaining power and used the CIA to organize a small air force. Initially equipped with armed North American T-6s, these were soon replaced by more capable North American T-28s. To crew the aircraft, the CIA recruited a number of Cuban pilots who were veterans of the Bay of Pigs fiasco. By April 1964 eight Cuban pilots were being used to conduct air strikes against rebel forces, while Belgians and other mercenaries flew transport and other support aircraft.

By June 1964 the Cuban cadre had increased to about twenty, mostly experienced B-26 pilots and the CIA sought to capitalize on this by obtaining a number of B-26s to add to the T-28s in service. However, all the operational USAF combat B-26s had been grounded and the *Farm Gate* aircraft were in storage at Clark AB. Four of the less fatigued Invaders were made airworthy, ferried to Okinawa for overhaul and then flown on to the Congo. Before they could arrive, however, events in the Congo overtook the deployment. Rebel forces captured the key city of Stanleyville and, with it, a number of American hostages. The Congolese government appealed to a concerned American government, which decided to deploy the few new B-26Ks being delivered by On Mark to the USAF. In August three B-26Ks were ferried from Van Nuys direct to Hurlburt Field, Florida, where they met flight crews from the 602nd Fighter Squadron. The B-26Ks, along with a C-130 with supplies, parts and mechanics, continued on across the South Atlantic to Leopoldville in the Congo, the aircraft arriving by 18 August.

The USAF crews immediately trained the Cuban pilots on the B-26Ks and they were in service within three days. By the end of August two of the four *Farm Gate* B-26Bs had also arrived at Leopoldville, but they were found to be in such poor condition that only one was left airworthy, the other becoming a spare parts source for the operational B-26s. A third B-26B crashed en route and the fourth apparently never left Okinawa. The airworthy B-26B was not used operationally but only for transportation.

B-26Ks were effectively used by the Cuban pilots in support of the Congolese government forces in both offensive and defensive operations. The B-26s and T-28s were nominally transferred to the Forces Aériennes Congolaises (Congolese Air Force) but remained under the operational control of the CIA. Two additional B-26Ks were delivered in January 1965. All the B-26Ks employed in the Congo were officially in storage at Hill AFB during their deployment.

By mid-November 1964 government forces were on the verge of recapturing Stanleyville and, out of concern for the Western hostages, a Belgian para commando force staged a raid against rebel forces in the city with the support of USAF transports and CIA B-26Ks. Eventually, the city was recaptured and most of the hostages freed.

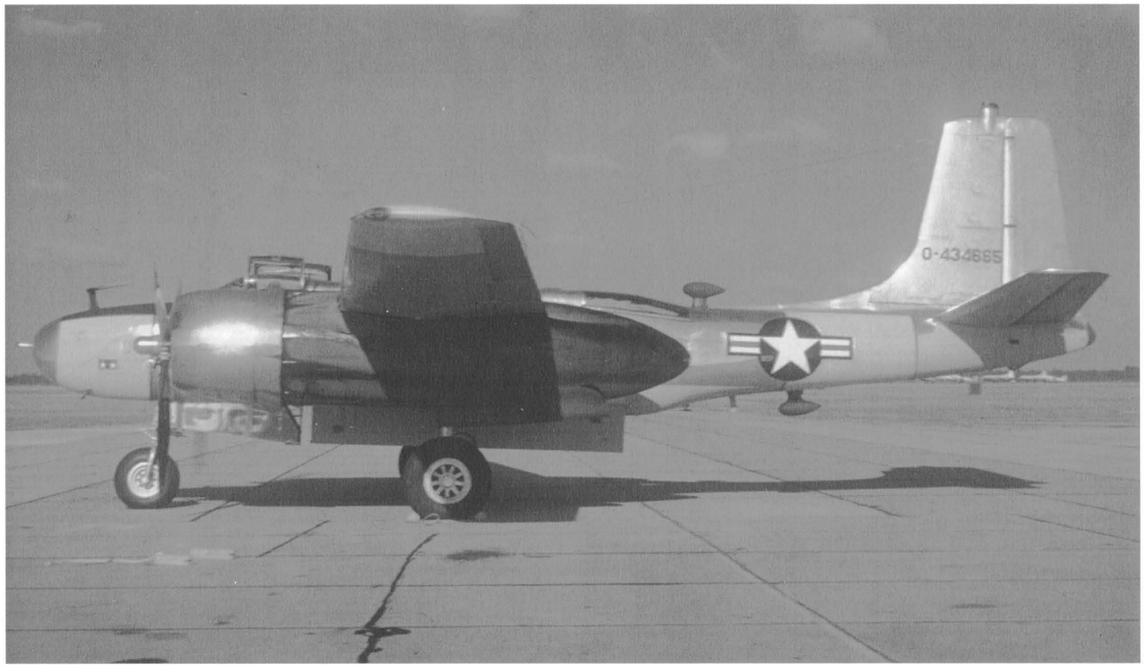
Through 1965 and 1966 government forces slowly regained control of the country, greatly assisted by the support of the B-26Ks and their Cuban pilots. In October 1966 the CIA began to detach the B-26Ks from the Congo to return them to USAF jurisdiction. By March 1967 all the B-26Ks were back in the United States. The fate of the two B-26Bs was different: both languished at Leopoldville until late 1966 when they were scrapped.

Laos

Project *Mill Pond* had ended in 1961 with a general ceasefire in Laos and the restated declaration by the several combatants that Laos was to remain a neutral country in the south-east Asian conflict. However, continued infiltration by North Vietnam with the tacit approval of the Laotian government, particularly with the development of the Ho Chi Minh Trail along the Vietnamese–Cambodian border, resulted in a covert response by the United States. Part of this was support for the Meo tribesmen in northern Laos in their battle against the Communists. The CIA also worked behind the scenes to train and equip any pro-American factions and used Air America crews to provide air transport and provisions as needed.

In 1964 the Laotian government, no doubt under some pressure to enforce its own neutrality, began to conduct half-hearted raids against the Ho Chi Minh Trail using Laotian Air Force T-28s. The United States notched up the effort in November 1964 when USAF F-105 Thunderchiefs based in Thailand began to conduct raids along the Laotian–Vietnamese border. The USAF raids increased through 1965 and into 1966 with the employment of A-1 Skyraiders and AC-47 gunships. Ignoring the supposed Laotian neutrality, the USA none the less refused to acknowledge the hidden air war it was conducting in Laos.

A number of B-26s remained in service into the early 1960s, including this one, s/n 44-34665, shown at Tyndall AFB, Florida, in November 1961. Structural failures caused all B-26s, except the new B-26Ks, to be withdrawn from service in early 1964. Dave Menard





Through the late 1960s and early 1970s there remained a number of B-26s stored at Davis-Monthan AFB, Arizona. Most eventually went to a similar state and were scrapped. This A-26A, 64-17678, was officially reclaimed in February 1973. D.E. Slowiak via Dave Menard



A line-up of stored B-26s at the Naval Weapons Center at China Lake, California, in June 1970. It may be assumed that these aircraft were eventually used up as targets to test a variety of new air-to-ground weapons for the Navy. Dave Menard Collection

In the spring of 1966 USAF headquarters decided to deploy eight B-26Ks to Thailand on a trial basis to determine their effectiveness against logistical targets along the Laotian border. Because the aircraft were to be deployed in Thailand for ostensibly defensive purposes, the Thai government reportedly insisted that they be reclassified as attack aircraft. The United States was more than agreeable and, in May 1966, the B-26Ks were designated as A-26As.

The A-26As were drawn from those at Hurlburt Field and formed as the Detachment One of the 603rd Air Commando Squadron (ACS), attached to the 606th ACS at Nakhon Phanom (NKP). The 606th was otherwise equipped with T-28s, C-123s and U-10s, all used to support the covert American effort in Laos. But because the A-26As were to be used offensively in neutral Laos the American markings were deleted from the aircraft. Detachment One and its A-26As were declared operational on 11 June 1966. For combat missions, the A-26As were assigned the call sign 'Nimrod'.

The A-26As began flying combat sorties against targets along the North Vietnamese–Laotian border in an area codenamed *Steel Tiger*. The first A-26A was lost to ground fire on 28 June 1966, during an orientation flight. Most of the A-26A missions were flown at night due to the increased air defences mounted by the North Vietnamese along their supply trails. Because of the limited success of the A-26As it was decided to



A forlorn B-26C at Davis-Monthan in November 1969. Some of these aircraft appeared on the civil register but most were scrapped. This aircraft, s/n 44-35466, was assigned a civil registration of N8019E but was never used. It was probably scrapped by the mid-1970s. Gordon Reid



Another B-26 in storage at Davis-Monthan, this view taken in 1963 of s/n 43-22732. There is no further record of this aircraft so it was presumably scrapped. Brian Baker

base the aircraft permanently in Thailand and additional aircraft were deployed from the USA. In December 1966 Detachment One was thus reformed as the 609th ACS and assigned to the new 56th Air Commando Wing in Thailand. The new wing had several squadrons equipped with a variety of T-28s, A-1s, C-123s and U-10s, as well as the A-26As. The Invaders remained based at NKP.

Through 1967 and 1968 Nimrod A-26As continued in their covert war against targets in Laos. A total of five Invaders were lost in action in 1967, but only one in 1968. The 609th ACS strength stood at thirteen A-26As in September 1967. In August 1968 the 56th ACW was redesignated as the 56th Special Operations Wing and the 609th ACS became the 609th Special Operations Squadron (SOS). The Nimrod mission began to shrink in 1969 as AC-130 and AC-119 gunships arrived in Thailand. By July 1969 a total of twelve A-26As had been lost during operations in Thailand and Laos. On 10 November 1969 an A-26A from the 609th SOS flew the unit's last sortie against a target in Laos and the aircraft were then withdrawn from service.

CHAPTER TEN

The Civil A-26 and B-26

In the half century since World War II ended the Invader enjoyed a prominent role as a civil aircraft. From its early use as fast transports and business aircraft, to more utilitarian employment as air tankers and equipment test beds, through to their current commemorative role as warbirds, the aircraft has proved popular and dependable.

Early Post-war Days

The flood of surplus warplanes in the fall of 1945 did not include any of the AAF A-26s. However, the process of ending production contracts at both Tulsa and Long Beach produced some seventy-four completed airframes that were not delivered to the AAF. The government accepted twenty-seven of the aircraft as part of the contract termination process and these were turned over to the domestic aircraft disposal organization, the Reconstruction Finance Corporation (RFC). The other completed aircraft at Long Beach and Tulsa were evidently retained there and scrapped along with incomplete airframes, airframes, component parts and tooling.

However, at least two of those completed aircraft at Tulsa survived to enter the civil register. The ownership of both may have been turned over to Douglas Aircraft. One of the two, s/n 44-35953, was registered as NX67150 to Douglas. It was later exported to Mexico where it operated as XB-KUX before disappearing from sight.

The other A-26C was s/n 44-35956, sold in late 1945. Though early details are sketchy, this aircraft was operated as NX37482 and played a special part in the early post-war years. NX37482, flying as racer #45, participated in the 1946 Bendix transcontinental air race as the *Caribbean Queen*, owned and operated by Caribbean Air Transport of Miami, Florida. Flown by Donald Husted, the Invader came sixth behind four Mustangs and an F-5G Lightning, with an average speed of 368mph (592km/h). It also beat several Lockheed P-38/F-5s and a Bell P-63. The famed cinema pilot Paul Mantz, in one of his two wet-winged P-51C Mustangs, won the race with an average speed of 436mph (745km/h).

Of the twenty-seven completed A-26s accepted by the RFC in 1945, twenty-two were A-26Bs from Long Beach and five were A-26Cs from Tulsa. These aircraft were built in July and August 1945, accepted for service, but not delivered. At some point, probably in October, they were flown to storage depots, all but one being ferried to Kingman Field, located in north-western Arizona. Kingman Field had served as a B-17 gunnery base until it was turned over to the RFC for use as a storage depot at the end of the war. Beginning in October 1945, thousands of surplus B-17s, B-24s, P-38s, P-40s and a variety of other types were ferried in from combat theatres and training commands. At its peak, Kingman was reported to have held more than 7,000 aircraft in neat rows along US Highway 66 and covering dozens of square miles of the desert scrub.

A contractor named Julian Meyers ran Kingman for the RFC and he remembered the arrival of the Invaders: 'I had twenty-six brand new Douglas A-26 airplanes come in that still had the paper on the seats and paper on the walls', he recalled in a 1990 interview. 'They were supposed to go to the military but instead they came to me. We sold every one of them for $2,000 each.'

Though the fate of two aircraft is undetermined, it is known that in February 1946 the aircraft broker Charles H. Babb, of Glendale, California, purchased twenty-two of the Kingman Invaders. Another two were purchased by Seeley G. Mudd, also of Glendale, sometime in 1946. The remaining two aircraft were probably sold also, though the Civil Aeronautics Administration had no record of them.

Babb may have, in fact, purchased them also but they never appeared on any civil register. They may have been exported or flown out and parked somewhere. The



Pacific Northern Airlines operated one of the early Babb A-26s. This view of NL67814 appears to be at Boeing Field in Seattle, Washington, probably in the late 1940s. Gordon S. Williams via AAHS



NX-67166 (s/n 44-35952) was one of the few A-26Cs that went to Kingman from Tulsa in October 1945 to be purchased the following February by Charles H. Babb. When this photograph was taken in New York City in 1947, the Invader had a radar unit installed under its left wing, reportedly used to detect oil deposits. The owner of the aircraft is unknown, but it went on to be operated by the Superior Oil Company and several other civil operators. It was last reported in 1969 and its fate is also unknown.
Harold G. Martin via William T. Larkins

twenty-four aircraft that are known to have been sold at Kingman were all assigned civil registration numbers by the CAA. The new owners were authorized single ferry flights to get the aircraft out of Kingman.

As for the other thousands of aircraft at Kingman, a handful were sold to new civil owners. However, in June 1946 the successor agency to the RFC, the War Assets Administration (WAA), sold all the remaining aircraft at Kingman and four other large storage depots to the highest bidders for scrap. At Kingman 5,483 were sold to the Wunderlich Contracting Co. for $2,780,000, or about $500 per aircraft. Over the next two years the aircraft were hauled to purpose-built aluminium smelters, broken apart and melted for the metal content. The warplanes left Kingman as 1,500lb (680kg) ingots.

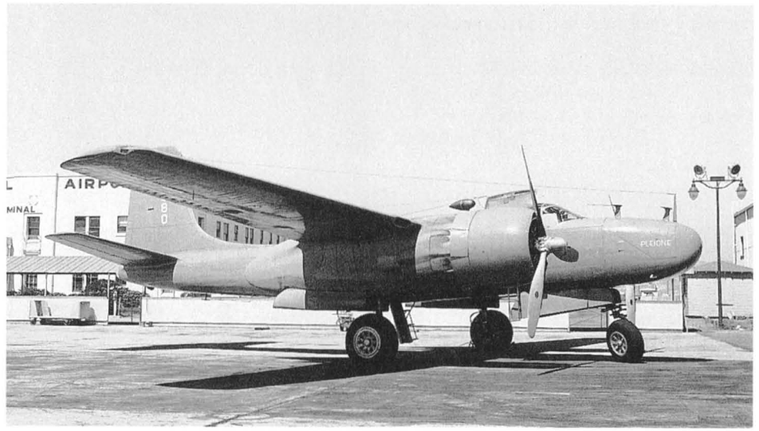
One sole A-26B was flown to the RFC storage depot at Walnut Ridge, Arkansas. That aircraft, s/n 44-34763, was also sold to a new civil owner, O.M. Goodsell, of Miami Beach, Florida, on 29 April 1946. This aircraft received the civil registration of NX65779; it disappeared from view shortly afterwards. (Some sources incorrectly show it as s/n 44-34733.)

Babb operated the Charles H. Babb Co., a well-known broker of surplus military aircraft through the post-war years. His company conducted dozens of domestic and international transactions that supplied aircraft to foreign military forces, corporations and survey companies among others. Babb purchased the A-26s, in his own name, on 6 February 1946. Each sale was recorded as a separate transaction and each aircraft was purchased for $2,000. Within several weeks the A-26s were ferried out of Kingman as was required by the RFC. Available records suggest that by April 1946 all of Babb's A-26s had been ferried to Grand Central Air Terminal in Glendale for temporary storage. All were offered for sale and became the primary source for anyone wanting an Invader.

Airworthiness Certification

Before December 1946 the only type of airworthiness certificate available for the A-26 from the CAA was in the experimental category. This restricted the operation of any civil A-26 as to geographical area and passenger carrying ability. Because the A-26 had never been evaluated and built under the requirements of the civil aeronautic regulations, Douglas had never received a production type certificate. It was thus not eligible to hold a normal or 'conformity' certificate that would customarily be issued to aircraft built for civil sale and indicated by an NC prefix to their civil registration numbers. Most surplus tactical aircraft were treated similarly and their licence level was denoted by the NX prefix to their civil numbers.

When this photograph was taken in 1947 at Oakland, California, N67880 (s/n 44-34762) was owned by industrialist Henry J. Kaiser and operated as *Pleione*. It was later operated by the aerial survey company Aero Services and reportedly abandoned in Timor in 1986. William T. Larkins





A number of the early Babb A-26s were purchased by the French government in the early 1950s, including this example, N67908 (s/n 44-34758). It served with France until 1967. This photograph was taken at Detroit, Michigan, in 1949 when the aircraft was being operated by the Ford Motor Company.
William J. Balogh via William T. Larkins

However, in December 1946 the CAA developed the limited type certificate programme for application to surplus tactical aircraft. By this method the CAA would evaluate a specific model aircraft and determine the minimum level of equipment requirements and operating limitations needed. If an owner were able to comply with the type specifications issued for the aeroplane, he could be issued with a 'limited' type certificate that was far less restrictive than the experimental licence. The first aircraft to be evaluated and issued a limited type certificate (LTC) was the Boeing B-17 Flying Fortress, with the second being the North American B-25 Mitchell. The third aircraft type was the A-26 and its limited approval was issued as L-3-4 on 19 December 1946. The original applicant and, thus, the holder of record for the A-26 limited certificate was Paul V. Shields, of New York City. Shields purchased one of the Babb aircraft, s/n 44-34774, on 2 December 1946 and had it modified to an executive transport configuration. It was registered as NX671763 until the limited certificate was issued, after which it became NL67163. Shields operated the A-26 until April 1948 when it was sold to the Standard Oil Company, of Chicago. That particular A-26 remains active on the American civil register, now operated as N917Y.

Flying Records

However, a number of the owners of the first civil A-26s flew them under the experimental certificates for a reason. Because of the performance characteristics of the Invader, it was popular in the early post-war years among those interested in setting endurance records or entering long-distance air races. As noted earlier, one of the first civil A-26s was entered in the 1946 Bendix race and placed sixth. However, two round-the-world flights by William Odom in 1947 put the A-26 on the front pages of the world's press.

Milton Reynolds was a successful businessman best known for his ball point pens. He was also something of an adventurer. William P. Odom was an AAF captain who was quite interested in setting endurance records with dramatic, long-range flights. Together, they came up with a plan to equip a surplus A-26 to fly around the world in an effort to beat a pre-war endurance record set by Howard Hughes. One of the Babb Invaders, 44-34759, had been sold in January 1947 to Pacific Northwest Airlines, of Seattle, Washington. Operating as NX67834, it was sold two months later to the Standard Cap and Seal Corp. of New York City. Reynolds quickly bought the model and had it registered to one of his companies, Printasign Corp. of America. Odom arranged to have extra fuel tanks installed in the fuselage and it was finished in a distinctive paint scheme with the name *Reynolds Bombshell* applied.

With a crew of three consisting of Odom as pilot, Reynolds as navigator and Carroll Sallee as flight engineer, the *Reynolds Bombshell* flew its first round-the-world record setting trip between 12 and 16 April 1947, completing the flight in 78h 55min 56sec, departing from and arriving at New York. Four months later, between 6 and 11 August 1947, Odom made the same flight again but this time he flew alone. He completed the second flight also in a record time of 73h 5min 11sec. The *Bombshell* was sold in September 1947 to a drilling company in San Antonio, Texas. Odom, however, went on to make several more record-setting flights, including one in March 1949 when he flew a Beechcraft Bonanza from Honolulu, Hawaii, to Teterboro, New Jersey, non-stop in 36h. Six months later, Odom was killed flying the highly modified P-51 Mustang the *Beguine* in the National Air Races at Cleveland, Ohio. The spectacular crash of the *Beguine* also killed two people on the ground and was a factor in the decision to abandon unlimited air racing for nearly a quarter of a century.

Another pilot eager to employ the high-performance of the A-26 for long-range flights was the aviatrix Dianna Cyrus. In December 1946 Cyrus purchased one of



The famous *Reynolds Bombshell*, NX67834 (s/n 44-34759), that completed two round-the-world record-setting flights in 1947 with Bill Odom at the controls. It went through a succession of owners and ended at a scrapyard in Tehran in 1986.
Harold G. Martin via William T. Larkins

the Babb A-26s at Glendale. Registered as NX67807, she stripped all the military gear out of the airframe and began to set a number of speed records. Dubbed the *Huntress*, Cyrus entered the 1947 Bendix transcontinental race, planning to fly non-stop with a bomb bay ferry tank installed. She encountered difficulties over Michigan, however, and did not complete the race. Paul Mantz, flying one of his P-51C Mustangs with wet wings, also planned to fly the race non-stop and ultimately won, his second of three post-war Bendix victories. Cyrus sold her A-26 in April 1948 to an Oklahoma pipeline company and moved on to a de Havilland Mosquito.

Other Disposals and Modifications

The other twenty Babb A-26s formed the backbone of the post-war fleet, at least for the first decade. A variety of companies purchased them for use as fast corporate transports. The Superior Oil Co. of Los Angeles operated at least two of the Babb Invaders and Standard Oil of Chicago operated six A-26s into the early 1950s. The aircraft was apparently popular with petroleum and drilling companies, as well as other industrial users.

The next batch of Invaders to be made available for purchase appears to have been a group of fourteen early-production B-26s released by the USAF for reclamation in 1950 and purchased by a junk dealer named Alex Roser in January 1952. Shortly afterwards, the Texas Railway Equipment Co. purchased the surplus aircraft and, in March 1952, arranged to have the aircraft licensed. The aircraft were assigned numbers within a block of registrations between N58Y and N75Y.

The Texas Railway Equipment Co., owned by Herman and George Brown of Houston, Texas, had been in the aircraft reclamation and surplus sales business since the first large scrapping sales in 1946. In fact, the company had been accused of conspiring with four others to fix the prices of surplus components being sold back to the government and also of controlling the bidding and awards process through behind-the-scenes manoeuvring. They owned or controlled the scrapping operations that were conducted at Walnut Ridge, Arkansas, in 1946–47 and at Altus, Oklahoma, in 1948–49. The Texas company sold nine of the A-26s to the Eastern Aircraft Sales Corporation in New York. In March 1953 Eastern negotiated the sale of seven aircraft to the French government for assignment to the L'Armée de L'Air. An export licence was issued by the State Department within few days and the seven were ferried to France for service shortly afterwards. The remainder of the group of Texas Railway Equipment A-26s were sold to corporate customers, among them the Standard Oil Co. and the Barnwell Drilling Co. of Shreveport, Louisiana.

Within a year of the Korean War ceasefire in the summer of 1954, the USAF began to release as excess many of the A-26s stored at Hill AFB, McClellan AFB and Davis-Monthan AFB. Though evidence is limited, it appears that many of these were made available in bid sales beginning in early 1956 and continuing at least through 1959. Well over a hundred surplus B-26s were added to the American civil register as a result of these sales.

Beginning in the mid-1950s, several aviation companies engineered numerous significant modifications to the basic B-26 design in order to make it more useful to civil operators. Each of these modifications was submitted to the CAA and, later, the FAA for engineering study. Each of the CAA or FAA regional offices maintained its own approval procedures and, in some cases, requirements. Before the establishment of the FAA in 1959, the CAA reviewed a modification and the supporting engineering documents. If they proved satisfactory, the CAA allowed additional similar modifications if done to the same engineering drawings. The new FAA established a more formalized process and awarded Supplemental Type Certificates (STC) for approved modifications. The owner of the STC was then authorized to modify subsequent aircraft to the same standard and the changes were approved on the basis of the STC. The owner of the STC could also license it to others interested in performing a specific modification to other aircraft.

If the impressive speed of the B-26 was attractive to companies seeking business transport, the fuselage size was a big drawback. The small cross-section was not the major hindrance, although it was surely limiting. Rather, the two wing spar carry-through structures in the bomb bay caused the most frustration to those seeking to turn the B-26 into a real executive transport. The rear spar, in particular, was the biggest problem as it effectively cut off the bomb bay area from the aft gunner's compartment. It was not really practicable to expect corporate officers to crawl happily through 3ft (1m) high passageways, no matter how well these were decorated with padding or wooden panelling.

Supplementary Type Certificates for the Douglas B-26			
STC	Owner	Item	FAA Region
SA3-538	Rock Island	95gal outboard wing fuel	CE
SA3-539	Rock Island	oil tank	CE
SA3-542	Rock Island	cockpit/cabin oxygen	CE
SA3-543	Rock Island	heater	CE
SA3-544	Rock Island	cockpit assemblies	CE
SA3-545	Rock Island	beacon	CE
SA3-546	Rock Island	aft heater	CE
SA3-547	Rock Island	fuel flow meter	CE
SA3-548	Rock Island	rear seats	CE
SA3-549	Rock Island	navigation lights	CE
SA3-588	Rock Island	fire detection	CE
SA3-609	Rock Island	canopy	CE
SA4-294	Tempo Design	nose-wheel steering	NM
SA4-385	On Mark	103in nose	NM
SA4-386	On Mark	JATO	NM
SA4-474	On Mark	avionics	NM
SA4-631	William G. Lott	fabric	NM
SA4-788	Cooper Engineering	fabric	NM
SA4-1113	Hamilton	dual controls	NM
SA4-1219	On Mark	fuselage pressurization, etc.	NM
SA4-1227	Rock Island	fuselage	CE
SA4-1577	F.R. Berry	enlarge fuselage	NM
SA316CE	Rock Island	Airstair door, etc.	CE
SA396CE	Matador Pipelines	Goodyear brakes, wheels	CE
SA458CE	Matador Pipelines	down spring	CE
SA873EA	Grumman	avionics	NE
SA43RM	Lynch Flying Service	stall fence, etc.	NM
SA44RM	Lynch Flying Service	increased gross weight	NM
SA261SW	Pan-American Petroleum	landing gear assemblies	SW
SA8075SW	Razorback Fabrics	fibre glass	SW
SA578WE	Intermountain Aviation	cargo door, aft fuselage	NM
SA692WE	On Mark	wing spar	NM
SA73WE	Hamilton	APU moved	NM
SA926WE	Aircraft Technical	wing spar	NM
SA1008WE	Poly-fibre	fabric	NM
SA1107WE	Matador Pipelines	wing spar	NM
SA1351WE	Ceconite	fabric	NM
ST00378LA	Duncan Aviation	TCAS	NM
ST129RM	Lynch Flying Service	Goodyear brakes, wheels	NM

One answer, of course, was the engineering of a spar modification to replace the obstructive spar rear carry-through. One of the earliest was what became known as the horseshoe frame by the Brentwood Engineering Co. This apparently raised the bottom of the carry-through structure to open up the aft cabin, although it did not provide for a true walk-through area.

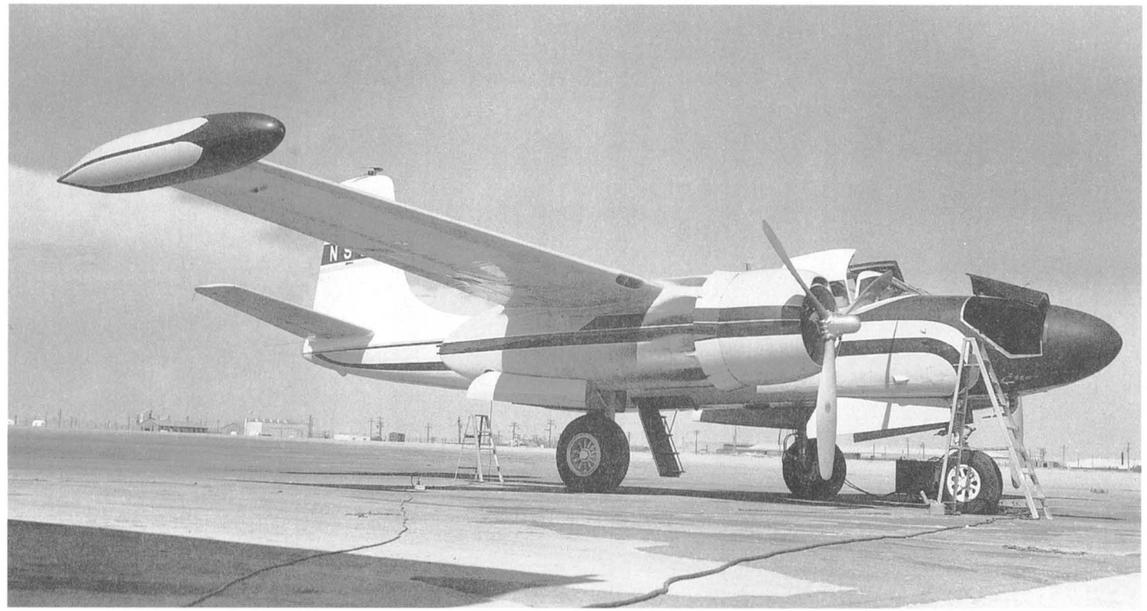
Later efforts, undertaken by On Mark and several other converters, installed a true ring spar to replace the carry-through structure entirely. This was no easy task because the rear spar is a significant part of the fuselage structure and integral to how the wing load-carrying capability was designed. Replacing the rear spar carry-through also required extensive rebuilding of the fuselage from the bomb bay aft to the tail section. Several of the conversion companies decided that, as long as such extensive work was being done on the fuselage, it might as well be rebuilt to increase its height and width significantly.

But, with the replacement of the rear spar structure, a relatively comfortable passenger compartment was available, one that extended from the front of the bomb bay, at the forward spar carry-through, back to the aft end of the gunner's compartment. Often up to eight seats were installed in this area. The bomb bay doors were removed and reskinned as part of the process and, in many cases, hydraulically-operated air stairs were installed either in the fuselage floor or, more popularly, on the right side of the aft fuselage. Another idea to solve the spar problem was to engineer a deeper fuselage that lowered the floor to provide a walk-through cabin beneath the spars. Both efforts to deal with the spar carry-through were attempted with varying results.

Other less dramatic modifications included new nose compartments for weather radar and cargo bays, upgraded flight decks and other equipment installations, new wheels and brakes with anti-skid systems, fuselage pressurization, steerable nose wheels, different engine and propeller combinations, a larger fuel capacity and anti-ice or de-ice capability. Between 1954 and 1964 there were at least seven companies that developed and produced highly modified B-26s with an eye to selling them as fast business transports.

Grand Central Aircraft

Grand Central Aircraft (GCA), based at the Grand Central Airport, Glendale, California, never developed a specific modification programme for the B-26. However, they pioneered early work on the B-26, beginning around 1950. GCA engineered and received authorization for a number of specific modifications to the airframe, including enlarging the aft gunner's compartment by lowering the floor and moving the aft bulkhead rearward, installing as much as eight additional fuselage windows, installing cabin furnishings, adding wing and nose fuel tanks, installing combustion heaters and adding additional avionics and equipment. One specific conversion was performed on B-26 N4825V (s/n 44-34768), with other work performed on B-26s owned by the Standard Oil Co., including N60Y and N62Y. However, with the closing of Grand Central Airport in 1955 the fate of the company is unknown and no additional work seems to have been done after that date. However, many of the modifications were incorporated into the conversions done by On Mark at nearby Van Nuys.



One of the On Mark *Marketeers* was N500M (s/n 44-34769). This view shows to good advantage the under-fuselage air stair door and the fuselage baggage compartment. Note also the wing-tip fuel tanks and the metalled-over canopy top of the cockpit, all features of the On Mark conversion. AAHS Collection

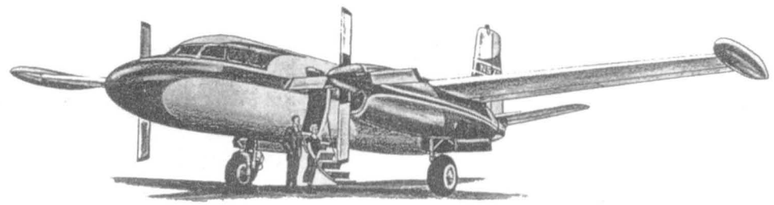
On Mark Engineering Company Marketeer and Marksman

On Mark was probably the best known and most prolific modifier of the B-26, having completed at least fifty civil and forty military conversions. The company was formed in 1954 by Robert O. Denny and L.A. Keithley at Van Nuys, California. Both Denny and Keithly were former employees of the Grand Central Aircraft Co. Denny had been president and Keithly operations manager when both resigned to form the new company. Grand Central had already undertaken modification work on the Invader, as had numerous other companies across the country. Evidently, though, Denny and Keithley had bigger plans and thus formed their new company.[133]



The On Mark *Marksman* was a extensive modification that provided a new pressurized fuselage and a stand-up cabin. A new canopy, featuring a DC-7 windscreen, was also added. More powerful versions of the R-2800 engines with new propellers and spinners substantially increased the performance from a standard B-26. This view shows N827W (s/n 44-34526) at Reading, Pennsylvania, in June 1961. Roger F. Besecker via AAHS

After the company had been formed, a number of specific modifications were developed to turn a surplus B-26 into a fast, roomy (in the comparative sense), executive transport in the pre-Learjet era. Many of the early conversions were based upon Grand Central Aircraft drawings approved earlier by the CAA. Among these were the lowering of the aft cabin floor, the movement aft of the rear fuselage cabin bulkhead and the installation of additional wing fuel tanks. At least nine B-26s were modified to some level by the company during the first two of years of business. Most of them were like those performed by On Mark on a B-26, s/n 41-39161, operated by the Humphrey Gold Company in Florida as N317V. On Mark installed a new cockpit with dual



This conceptual drawing of the 450 *Marksman* reveals the B-26 heritage in the wings and tail group. The fuselage, however, was planned to be all-original in construction and power was provided by two Allison turboprop engines. On Mark never proceeded beyond the drawing stage, however, deciding instead to concentrate on straight Invader conversions.

controls, dual pane windows to reduce noise levels, a hydraulically-operated air stair door on the aft fuselage and a large luggage area. A passenger cabin with two sets of facing seats was installed in the area of the former gunner's compartment. The compartment was soundproofed and heated using either of two Janitrol heaters installed in the nose and aft fuselage.[134]

On Mark also became the exclusive licensee of Douglas Aircraft for the production of spare parts for the B-26 and specialized in overhauling components for a variety of users. The company was thus endeared to the USAF, still operating a substantial number of B-26s in the mid-1950s. On Mark was a government-approved repair agency that also engaged in the repair and modifications of other types of large executive and airline transport.[135]

As some point, probably in 1956, a steel circumferential beam or ring spar was developed by On Mark. Permanently installed wing-tip fuel tanks with a capacity of 165gal (625ltr) each were also approved for installation. Both modifications never received an actual STC since they were developed and approved by the CAA. These new features and the earlier basic modifications were soon packaged as the On Mark *Marketeer*, approximately thirty of which were eventually completed. On Mark offered the aircraft with the standard 2,000 horsepower R-2800-75/79 engines or upgraded with the 2,500 horsepower R-2800-CB16 powerplants. The upgraded engines boosted the cruising speed from 315mph (274 knots true airspeed [KTAS]; 507km/h) to 365mph (318 KTAS; 588km/h) at 62 per cent power. Other features of the *Marketeer* were soundproofing and insulation, an air stair door on the starboard aft fuselage or a stairway hatch under the fuselage, a baggage compartment in the nose, disk brakes, dual controls and, as an option, reversible pitch propellers.

The cabin of the *Marketeer* was unpressurized. It featured panoramic windows on each side of the fuselage plus additional window installations through the cabin area, all based upon earlier Grand Central Aircraft drawings. The interior could be fitted to customer specification but usually featured several armchair seats installed facing either forward or aft, a divan-type seat mounted sideways, folding tables and a private toilet. Up to eleven seats could be installed in the cabin for, no doubt, close friends, in addition to the two pilots in the cockpit. The useful load was specified at 12,000lbs (5,450kg) for a maximum gross take-off weight of 35,000lb (15,900kg). In the days of corporate DC-3s and Beech 18s cruising at a stately 140mph (225km/h), the 365mph Marketeer offered a distinct alternative.

In 1960 On Mark began developing a new series of B-26 conversions that offered a pressurized cabin. Billed as the *Marksman* series, the modifications stretched the definition of the STC to the absolute limit. Essentially, a stock B-26 was rolled into the hangar at On Mark and was dismantled. The upper fuselage from the cockpit aft to the end of the fuselage was removed and discarded. The fuselage was reconstructed with an aft ring spar and new structure that heightened the fuselage to provide a stand-up cabin of 6ft 1in (2m). The cockpit, besides being equipped with dual controls and customized avionics, was covered with a structure resembling the external cockpit of the Douglas DC-7 with similar windows and a bird-proof, heated windscreen. The passenger cabin aft of the cockpit was fitted to carry from six to eight passengers and was equipped to a customer's specifications. The pressurization system was capable of maintaining a cabin pressure equivalent to a ground height of 6,800ft (2,100m)

On Mark purchased a surplus B-26 in May 1956 from those stored at Hill AFB, Utah. Registered as N2889D, the company used it as a prototype for many of their Invader modifications. In 1957 it was sold to the Youngstown Sheet & Tube Co. of Youngstown, Ohio. It has since been through a succession of owners. Scott Thompson



Known On Mark Marketeer or Early On Mark Conversions	
AAF s/n	**Civil Registration**
?	N2DM
41-39161	N1470V, N317V, N317W, N26RP
41-39215	N5272V, N5292V, N4000M, N200M, N142ER
41-39497	N71Y
41-39516	N237Y
43-22258	N1469V, N36B, N94445
43-22444	N4050A
43-22602	N9990Z
44-34390	N6836D
44-34423	N9594Z, C-GHLI
44-34524	N58Y, N588, HK-999E
44-34550	N7769C, CF-CCR, N355Q, HK-1247W, HK-1247P
44-34616	N2890D, N300V
44-34713	N5538V, N36B, N706ME, N26MR, N26WB, N706ME
44-34738	N9861C, N600D, N808D, C-GWLU
44-34754	N66662, N666
44-34769	N67162, N500M, N29711, N500MR
44-35201	N8025E, N137WG, N437W
44-35326?	N2889D, N40Y, N401Y
44-35495	N2076A, N501N, N507WB
44-35562	N707TG, N9176Z, N7079G
44-35681	N60Y, N160Y, N168Y, CF-VPR
44-35698	HP-318-P, N5001X, N800V,
44-35708	N5530V, C-GXGY
44-35710	N7705C
44-35913	N3522G, N303W, N303WC
44-35938	N4203A, N510X, N510A, N516X, D-BACA

cabin up to an altitude of 20,000ft (6,100m) at a maximum pressure differential of 4.62lb/sq in (3,520kg/sq m). (By comparison, a modern Learjet 60 maintains a cabin altitude of 8,000ft (2,400m) to an altitude of 51,000ft (15,555m) with a maximum differential of 9.8lb/sq in [6,900kg/sq m].) A new 8ft 4in (2.5m) metal and plastic nose was fitted for baggage, a radar installation and no doubt an attempt to maintain a reasonable centre of gravity.

Other features included Ceconite-covered control surfaces, air conditioning, propeller and carburettor anti-icing, an engine-fire detection and extinguishing system, an upgraded electrical system and a 50,000Btu Janitrol combustion cabin heater. Optional equipment was also offered. Nose wheel steering could be installed, along with a larger, all-metal rudder to offer better single-engine control. A Goodrich de-icing system, anti-skid brakes and additional fuel capacity were also available. Provision for the installation of JATO bottles in the rear of the engine nacelles was also engineered, tested and approved.

The On Mark *Marksman* was offered in three configurations: the *Marksman* A, the *Marksman* B and the *Marksman* C. The basic version was the *Marksman* A, with two 2,100 horsepower R-2800-83AM3s engines. The standard fuel capacity was 800gal (3,030ltr). The *Marksman* B was equipped with similar 2,100 horsepower R-2800-83AM-4A engines, offered two 165gal (625ltr) tip tanks and DC-6 wheels with Goodyear brakes and highly polished, chromium-plated landing gear. The *Marksman* C, the most common of the conversion series, was equipped as the other versions, but had two 2,500 horsepower R-2800-CB-16/17 engines, Hamilton Standard fully reversible-pitch propellers and two 100gal (380ltr) internal auxiliary wing tanks. The additional fuel boosted the capacity to 1,330gal (5,030ltr) and offered a maximum range, with reserves, of 2,500miles (4,025km). As with the other On Mark conversions, the maximum gross take-off weight remained at 35,000lb (15,900kg). The modifications for the *Marksman* series were contained in four STC approved in January 1961. The first conversion was delivered in 1962 and there were eleven known subsequent ones.[136]

In 1964 On Mark introduced a cargo transport version that featured a cargo door, measuring 3ft 1in by 5ft 7in (1m x 1.7m) in the aft belly fuselage. The door was articulated to fold upwards against the aft pressure bulkhead of the cabin. The floor of the cabin was equipped with cargo restraints or seat mounts. Containers could be air-dropped by rolling them from the cabin out of the cargo door. On Mark specified that drop speeds up to 310mph (500km/h) were possible. The cabin could also be equipped with up to twelve seats for passengers who, presumably, could also be air-dropped as needed. FAA records indicate that the actual holder of this STC was Intermountain Aviation, a CIA proprietary company based near Tucson, Arizona. It would appear that On Mark converted two B-26s to the *Marksman* configuration, added the special cargo door and delivered them to a CIA company. At least one of these was operated by Air America pilots from a base in Thailand and used for night air drops in Laos in 1966 (see Chapter 9).

Beginning in 1957, On Mark also explored the design and production of a turboprop-powered executive transport designated as the *450 Marksman*. This original-construction aircraft was powered by two 3,750 horsepower Allison 501D engines and a completely original fuselage. Other components appeared to have been reworked B-26 wings, landing gear and tail group. Production was expected to reach two aircraft per month. However, the aircraft apparently did not proceed beyond the drawing board and On Mark again concentrated on converting B-26s.

Known On Mark Marksman Conversions	
AAF s/n	**Civil Registration**
41-39163	N2022A, N2DD, N61B, N161Q
41-39221	N9636C, N256H, N26GT
43-22416	N1394N, N100Y, N190Y, N40XY
44-34415	N5002X, N900V, N46598
44-34526	N9178Z, N827W, N551EH, N400V, N7977, N26AB
44-34567	N9412Z, ZS-CVD
44-34761	N67158, N400E, N60XY, N60XX
44-34765	N67160, D-CAFY (not taken up), N67160
44-34766	N67807, N1243, N910G, N910H, N9150, N26BK
44-35617	N7660C, N600WB
44-35870	N1471V, N320, N99426

In 1962 On Mark was selected by the USAF to build a prototype conversion of the B-26 for use as a counterinsurgency weapon. Utilizing most of their approved STC modifications plus a number of USAF specified upgrades, On Mark produced the YB-26K Counter Invader. After the USAF evaluated the prototype, On Mark went on to convert forty USAF B-26s to the B-26K configuration (again see Chapter 9).

As the market for converted B-26s began to falter in the mid-1960s, On Mark turned their efforts toward other airframes. They were instrumental in the development of the original Boeing 377 conversion that produced the Guppy series of oversized transports. However, by the early 1970s the company was apparently out of business.

Lockheed Aircraft Services Super 26

Based at the Ontario International Airport in southern California, Lockheed Air Services (LAS) developed the Lockheed *Super 26* in 1960. LAS, a subsidiary of the Lockheed Aircraft Co., was a large aircraft maintenance and modification centre. Under contract with the Mesta Machine Co. of Pittsburgh, Pennsylvania, LAS radically modified Mesta's B-26, N5052N (s/n 44-35999) to an executive transport configuration. Mesta had operated their B-26 for at least six years as a company aircraft before having LAS perform the conversion. Once again, the fuselage was the focus of attention. Most of the structure forward and aft of the cockpit was discarded. A new fuselage section, with a length of 22ft (7m), a height of 6ft (2m) and a width of nearly 5ft (1.5m), was constructed. Features of the new section included pressurization and an electrically-operated air stair door on the starboard side aft of the wing. A forged steel ring spar replaced the standard rear spar carry-through structure.[137]

Other modifications included cabin insulation, air conditioning and heating systems, the provision of a lavatory and a fibreglass nose containing additional baggage space and an avionics bay. The cockpit had a heated windshield and Lockheed Constellation-type windows were used throughout the fuselage.

Thirteen hours of flight testing followed with the FAA in the late summer of 1960. Among the results, it was determined that the pressurization system would maintain a 5,000ft (1,500m) cabin altitude at 14,500ft (4,400m) and an 8,000ft (2,400m) cabin altitude at 20,000ft (6,100m). The FAA granted an STC for the modification in September. One additional *Super 26* may have been produced, records suggesting that N300V (s/n 44-34616) was also converted. However, the FAA does not currently maintain a record of the STC approved for LAS so the fate of its paperwork is unknown.

As for the single known *Super 26*, it was operated for several years by Mesta. The aircraft went through several subsequent civil owners. At some point in the 1970s it was purchased for spare parts support by B-26 tanker operator Airspray at Red Deer, Alberta. It was slowly stripped of usable parts in the subsequent twenty years. Then, in October 2000, the old airframe was lost in a disastrous hangar fire at the Airspray facility.

LeTourneau Conversions

The R.G. LeTourneau Co. of Longview, Texas, was one of the earliest civil operators of the B-26. The company had long recognized the value of company aircraft and started a flight department with Waco biplanes in 1935. Through the years they developed the resources to modify aircraft to fit their own specific needs, including engine and airframe shops for maintenance and conversions. The company obtained one of the Babb A-26s as early as 1947 and operated it in support of its world-ranging industrial activities, particularly in South America and Africa. After using the Invader, registered as N67165, for three years the company undertook a number of modifications to improve its range and cabin furnishings. Among these were the installation of additional fuel tanks, fuselage reskinning, removal of all military equipment and the provision of passenger seats in the aft gunner's compartment. The company continued to operate the B-26 until it was destroyed in a take-off accident in the mid-1950s.[138]

LeTourneau Conversions	
AAF s/n	Civil Registration
41-39418	N7937A, N116RG
41-39437	N7938A, N117R
43-22275	N4974N, N115RG
44-34134	N4973N, N114RG
44-35949	N67165

Two additional B-26s were soon modified to a similar configuration for use by the company. An additional bomb bay fuel tank was installed in one B-26 to create a long-range version. It was significant that no major structural changes were undertaken. It was decided to accept the penalty of the imposing rear-spar structure to retain the basic strength of the airframe. The bomb bay was sealed and the compartment floor lowered by 3in (7.6cm) with the elimination of the thick bomb bay doors. In the long-range conversion a fuel tank was installed in the compartment. In the medium-range version a two-man couch was installed.

Range was obviously important for the aircraft's operations. The medium-range model had additional wing fuel tanks installed and could carry 1,350gal (5,100ltr) for a 2,100miles (3,400km) range with reserves. The long-range model carried the additional bomb bay tank for a total capacity of 1,700gal (6,400ltr) for a 3,000miles (4,800km) range. The empty weight of both was about 22,000lb (10,000kg), similar to a military B-26, with the maximum gross take-off weight also set at 35,000lb (15,900kg).

The aft fuselage bulkhead was moved back about 18in (0.5m) to enlarge the gunner's compartment to a length of 10ft 4in (3.2m). The compartment Plexiglas was replaced with skinning, providing a compartment height of over 5ft (1.5m). Into this area four seats were installed; two across the back and two along the side of the compartment. The two side seats could be folded down to make a three-man couch.

The cockpit was left in a military standard configuration with a single set of controls. However, an additional passenger seat was installed on the right side of the cockpit and insulation was added. Additionally the tops of the clamshell canopies were replaced by metal. A hydraulically-operated hatch equipped with a stair was installed in the floor of the former bomb bay to provide access to the rear compartment and the cockpit.

In the process of converting the aircraft the fuselage sections were completely reskinned with thicker gauge aluminium to maintain the strength of the original design after the removal of military components. Baggage compartments were installed in the nose and tail sections and an air-conditioning system was installed in the aft compartment.

After the success LeTourneau enjoyed with the aircraft, the company decided in 1959 to offer the conversions to other operators as a package. If another operator brought his own B-26 in, LeTourneau would convert it for $125,000–$250,000. Or LeTourneau had obtained two surplus B-26s that could be used instead. Despite its best efforts, there is no indication that LeTourneau performed any conversions for outside customers. Eventually, the two surplus B-26s were also converted for the internal use of the company. The four B-26s were operated as N114RG, N115RG, N116RG and N117RG through the early 1960s.

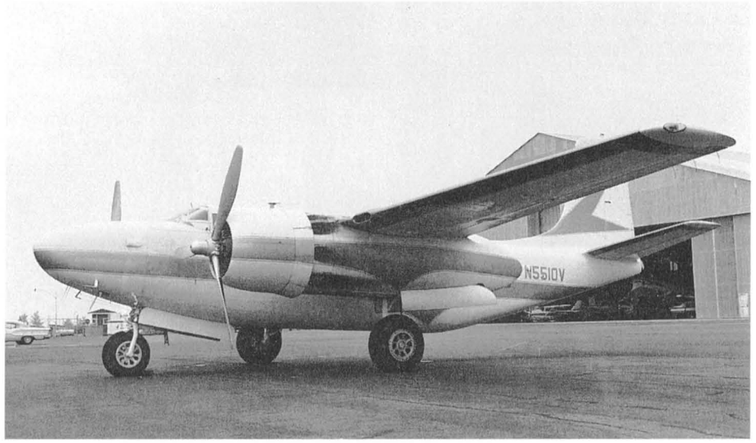
Rhodes Berry Company *Silver Sixty*

The Rhodes Berry Co. was an aviation consulting engineering company based in Los Angeles. In 1959 it developed a fuselage modification for the B-26, the basis of which was to deepen the floor to allow a 6ft 6in (2m) high interior passenger cabin without replacing the rear-spar carry through structure. The cabin length was 22ft (6.7m), allowing the installation of up to sixteen seats.

The fuselage was created by removing the lower half of the original Invader fuselage. A new lower fuselage was built in four sections. New longitudinal members were installed through the remaining part of the original fuselage to mate with the new sections. The original fuselage structure was strengthened to become fully monocoque to blend with the new assemblies. Two strong keels were built into the bottom of the new fuselage to provide protection in the event of a wheels-up landing, since the fuselage now extended below the level of the engine nacelles.

An air stair door was built into the left side of the fuselage aft of the wing. A crew and baggage door was provided on the right just aft of the cockpit. Large windows, including two panoramic-size openings, were installed at eye level in the cabin. One advantage of the deeper cabin was the ability to have the nose wheel retract straight back into the nose wheel well. On a standard B-26 the nose wheel assembly rotates 90 degrees to fit flush underneath the cockpit floor. However, the substantial drag presented to the airflow as the nose wheel turned through this angle was potentially critical in the event of an engine failure and this was eliminated on the Rhodes Berry design. The designers of the new fuselage also claimed that their new fuselage was aerodynamically cleaner than the Douglas design and that areas of airflow separation near the wing root were eliminated.

In mid-1959 the Rhodes Berry Company arranged to have the Volitan Co. of Pacoima, California, build a prototype of the new design, dubbed as the *Silver Sixty* by the company. Volitan operated an aircraft maintenance and modification centre at Whiteman Airport near Burbank. Volitan are perhaps better known for their contribution to Volpar, a company that specialized in the modification of Beech 18s. Volitan owned half of Volpar, their partner in the endeavour being the Paragon Engineering Corp. However, Volitan also agreed to build the prototype *Silver Sixty* and then manufacture modification kits for converting additional B-26s.[139]



Barely revealing the sleek lines of the B-26, the Rhodes Berry *Silver Sixty* was the most dramatic attempt to produce a fuselage suitable for use on a business aircraft. Obviously, most of the fuselage structure was original construction and it featured a 6.5ft (2m) walk-through cabin. Modification work was performed by the Volitan Co. of Pacoima, California. Only one such aircraft is known to have been modified. AAHS Collection

Volitan began work on N5510V (s/n 41-39262) in 1959. The first aircraft was earmarked for the Whiteman Manufacturing Co. and first flew in June 1960, at least eight months behind the projected schedule. The resulting airframe was markedly ugly when compared with the sleek lines of the standard aircraft. However, Volitan was gearing up to produce two modification kits per month, with Rhodes Berry planning to provide the engineering work for customized interiors for the new models. The conversions were offered with other upgrades such as 2,500 horsepower R-2800 CB-16 powerplants, weather radar, anti-skid brakes, nose wheel steering and additional fuel tanks.[140]

The basic modification was priced at $100,000, based upon the production of ten conversion kits. None the less, the demand for the conversion did not materialize. Some sources suggest that one additional airframe was converted to the *Silver Sixty* configuration although this has not been confirmed. Whiteman Manufacturing did take delivery on N5510V and operated it for a few years. At some point, it appears the aircraft was exported to a Philippine owner and was reportedly destroyed in a 1965 crash.

L.B. Smith Aircraft Corporation Tempo

Another attempt to design a new fuselage for a business transport B-26 conversion was made by the L.B. Smith Aircraft Corp. of Miami, Florida. The company offered large aircraft conversions, maintenance, overhaul, leasing and financing services. Aside from the work on the B-26, it also produced a conversion for the Curtiss C-46 marketed as the Smith Super 46-C through the late 1950s.

The company's effort with the B-26 sought to eliminate both the front and the rear spar structure by replacement ring spars. Its first attempt used most of the existing structure of the B-26 but the ring spars used wing mounts outside the fuselage. Mounting the wings to the spars in such a fashion extended the wingspan of the B-26 and resulted in a wider ground track. Though details are sketchy, this conversion was offered as the Smith *Biscayne 26*, only one of which was apparently constructed. Specific details of this particular aircraft have not been



One of the On Mark *Marketeers* was N500M (s/n 44-34769). This view shows to good advantage the under-fuselage air stair door and the fuselage baggage compartment. Note also the wing-tip fuel tanks and the metalled-over canopy top of the cockpit, all features of the On Mark conversion. AAHS Collection

recorded. However, despite the innovative new structure, the basic fuselage of the B-26 remained narrow and shallow, a limiting feature that could really be solved only by replacing the cabin area of the fuselage.

The resulting Smith *Tempo* featured a completely new fuselage built around two large aluminium ring spars for the wing attachments. These spars were constructed of 1.25in (3.2cm) thick rolled aluminium alloy plate and replaced both the forward and the rear carry-through structures. An additional feature of the ring spars was that they extended as stubs from the new fuselage sides. The method of attaching the wings thus extended the wingspan and increased the aircraft wheelbase to 15ft 4in (4.7m). The fuselage itself used a few components from the original B-26 but mostly consisted of new construction. The new fuselage stretched to more than 60ft (18m) in length, nearly 10ft (3m) longer and 1ft (0.3m) deeper than a standard B-26. The cabin itself was 26ft (8m) in length and could seat between ten and thirteen passengers plus a crew of two pilots. The cabin featured eight windows, one of which was used as an emergency exit. An air stair door was installed on the left side of the fuselage aft of the wing. The cockpit was entirely redesigned and featured a variety of avionics according to customers' specifications.

The wings and tail section were essentially unchanged from those on the standard B-26. However, wing tip tanks with a capacity of 185gal (700ltr) each were permanently attached and additional auxiliary fuel tanks of 100gal (380ltr) each could be installed in the outer wings. Total fuel capacity could thus be increased to 1,370gal (5,200ltr).

L.B. Smith offered the *Tempo* in two versions, the only difference between *Tempo I* and *Tempo II* was that the latter was pressurized. The company constructed one prototype of the *Tempo II* based on s/n 44-35640. Registered as N4204A, it first flew from Miami in October 1959. L.B. Smith offered the Tempo conversion for $375,000, a significant investment and apparently too expensive for the market. Faced with competition from other, cheaper alternatives and new turbine-powered equipment, the Tempo conversion never progressed beyond its prototype version. N4204A was operated by several companies in the ensuing years. By 1969 it was being operated by the University of Nevada as a weather research aircraft. However, it was lost in a 1980 accident during a research flight.



One of several known *Monarch* conversions done by the Rock Island Oil and Refining Co. was N6841D (s/n 44-35643) in the early 1960s. Though not as dramatic as some of the other B-26 conversion programmes, the *Monarch* did feature a slightly enlarged fuselage with a ring spar. Rock Island, based at Hutchinson, Kansas, owned at least twenty-seven Invader airframes in the 1960s, though it is unknown how many were eventually modified. Harry B. Adams via AAHS

Rock Island Oil and Refining Company *Monarch-26s*

The aviation department of the Rock Island Oil and Refining Co., based at Hutchinson, Kansas, had at least twenty-seven B-26s pass through their ownership between 1957 and 1963, an extraordinary number in such a short time. At least ten



Typical surplus USAF Invader as delivered from storage is seen in this July 1958 view of N5589A (s/n 41-39303) at Linden, New Jersey. This ended as a spare part source for Lynch Air Tankers at Billings, Montana. Its fate is unknown. Ken A. McLean via AAHS

of these had a series of civil modifications completed, the resulting aircraft becoming known as *Monarch-26*s. Little has been uncovered about the extent to which these aircraft were converted, whether it was for commercial sale to other users or for internal use.

What is known, though, is that Rock Island developed and had approved fourteen STCs for modifications to the B-26, by far the largest holder of STCs for the type and remarkable for such a brief period. These include fuel and oil tank installations, canopy modifications, a fire-detection system, modified fuselage and air-stair door installation. An examination of a surviving *Monarch-26* reveals that a ring-spar conversion was included in the fuselage STC and that the fuselage cabin was heightened and lengthened during the conversion process. Many of the initial modifications were completed on N8392H (s/n 44-34602), evidently the first Monarch conversion, in 1958 or 1959.

Before 1960 Rock Island was known as the Wood River Oil and Refining Company, located at Wichita, Kansas. In June 1957 Wood River submitted the winning bid to purchase six surplus USAF B-26s for $68,000. The six were assigned registrations in a block between N6836D and N6841D and it is believed that most were converted to the Monarch configuration at Hutchinson after 1960.



The B-26 was first employed as an air tanker in 1961 and one of the first companies that operated them was Rosenbalm Aviation at Medford, Oregon. This April 1965 view shows one of the Rosenbalm tankers, N4819E (s/n 44-34609) with the distinctive 1,200gal (4,500ltr) retardant tank extending below the bomb bay. Scott Thompson Collection

Between 1958 and 1960 Wood River purchased an additional twenty surplus B-26s from the USAF, these being assigned civil registrations in a block between N4805E and N4824E. By 1963 the Rock Island Oil and Refining Co. had been taken over by the giant Koch corporation and the Hutchinson facility was eventually closed. However, FAA records indicate that at least one B-26, N4805E, was converted to the Monarch configuration as late as 1968. Additional details about the *Monarch-26*s remain elusive.

Tankers

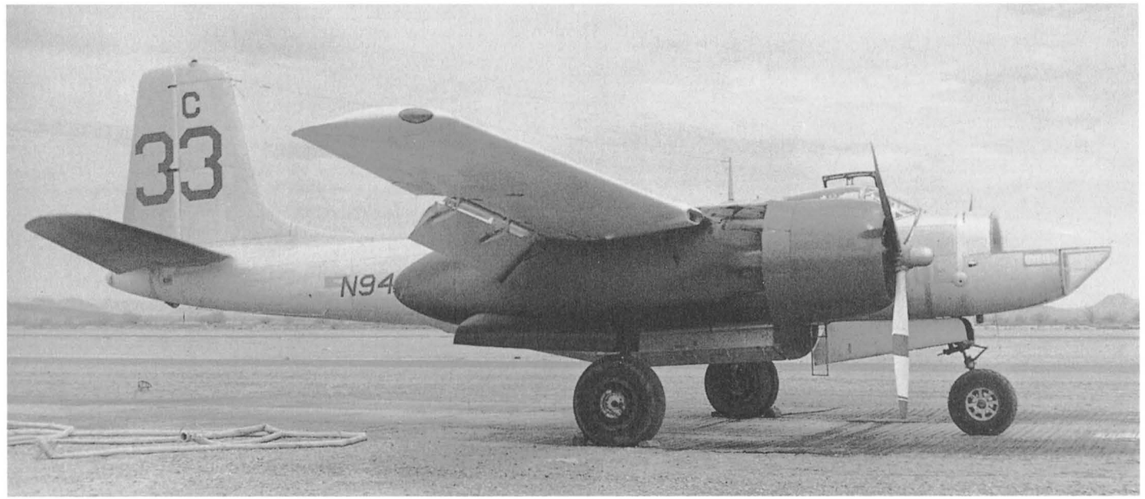
The B-26 was part of the group of surplus military aircraft that enjoyed a surge of popularity beginning in the late 1950s. The performance and load-carrying ability of the B-26, as well as of the B-25, B-17, PBY, PB4Y and TBM among others, made them useful to the young industry of air attack on forest and range fires in the United States and Canada. Though not as ultimately popular on the fire lines as some of the other types, the B-26 has enjoyed a long use as an air tanker from the first aircraft modified in 1960 to the Airspray fleet of 2002.

Although using aircraft in forest fire attack dates to the early 1930s, the history of the modern air tankers can be traced to the efforts of Paul Mantz in the mid-1950s when surplus TBM torpedo bombers were converted to carry water

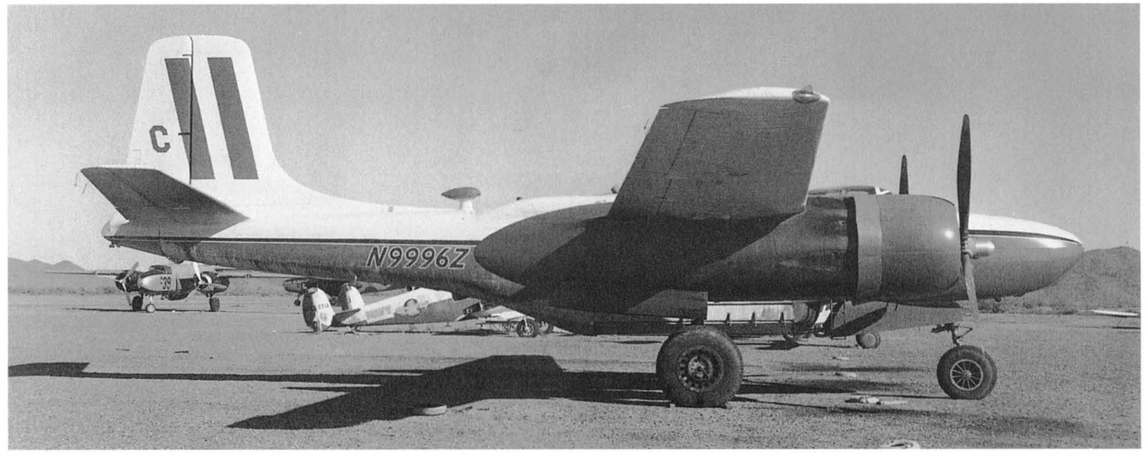


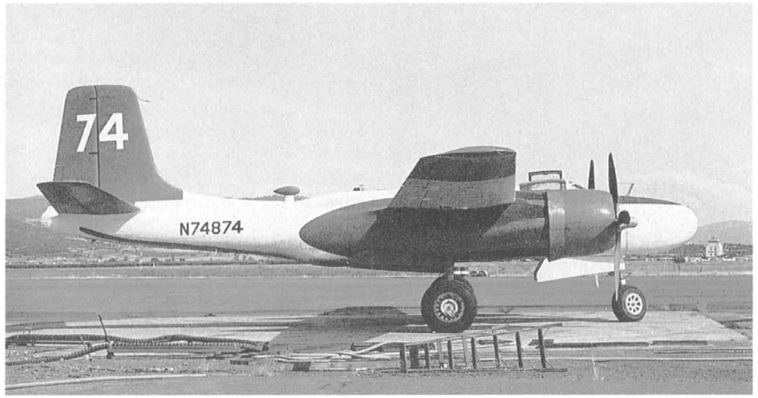
Left: **Another view of air tanker N4819E (44-34609) at Buckeye, Arizona, in December 1990. At some point during its use as a tanker, wing leading edge modifications were done to try and improve its low-speed handling. This aircraft was still at Buckeye in 2001 in much the same condition.** Scott Thompson

Below: **Tanker C33 at the Deer Valley, Arizona, airport in 1963. Operated as N9401Z (s/n 44-35524) by Donaire, this tanker operated in the USA until 1972 when it was sold north, joining the Airspray fleet as CF-UCI.** Milo Peltzer



Bottom: **Another Donaire tanker was N9996Z, also shown at Deer Valley, Arizona, in 1963. This survived to join the Airspray fleet in 1972 where, as CF-CKB, it continues to fly as Tanker 11.** Brian Baker via Milo Peltzer





This attractively-finished tanker was operated by Rosenbalm Aviation at Medford, Oregon, in the late 1960s and early 1970s. It is shown here in 1970 and does not appear to have a retardant tank installed. N74874 (s/n 44-34508) remains on the civil register and may be stored at Rantoul, Kansas. Milo Peltzer Collection

tanks. Mantz demonstrated the utility of using aircraft against fires and through the late 1950s several national and state fire agencies initiated experiments with larger tankers and different equipment. Through the early years the air tankers were generally known as 'borate bombers', the popular term derived from the chemical slurry developed for – and dropped from – the air tankers of the period.

By 1958 several B-25s had been converted by private companies seeking contracts with the US Forest Service (USFS) to provide air tankers. State agencies, particularly the California Division of Forestry (CDF), also provided contracts to air-tanker operators to provide an air attack capability on a stand-by basis. These operators gambled by purchasing surplus military aircraft, primarily from USAF stocks at Davis-Monthan AFB, and converting them to air tankers in the hope of being awarded contracts. In 1960 there were at least a dozen companies eagerly pursuing conversions and contracts. That was the first year of operation for the larger B-17, but the fortunes of the B-25 operators were not good. Four B-25 tankers crashed during the last week of July 1960, with all the accidents being generally attributed to faulty piloting and maintenance. However, any enthusiasm the USFS or state agencies had for the B-25 quickly vanished and all were eventually eliminated from tanker contracts.

The tanker companies competed for work from each of the USFS regions, the CDF and other state fire agencies. Initially, the contracts paid for tanker services on a per-trip basis, so that the tanker operator who could get to a fire first made the money. This naturally led to some cut-throat operating practices and in short order a more organized process of awarding stand-by contracts was put into place. Contracts were let to provide for an even geographical coverage across the western and south-eastern United States, with air tanker bases being established as needed.

Each USFS region administered its contracts as it saw fit, however, and imposed and enforced its own set of regulations. Thus, different regions set different requirements that might exclude some tanker types. Tankers approved for use by the USFS were assigned tanker numbers. These were originally prefixed by a regional code letter to indicate to which region an aircraft was assigned. These codes were eventually eliminated and replaced by assigned nationwide tanker numbers.

With the demise of the B-25 tanker, the B-26 was available to fill the bill between the small capacity, single-engine TBM and the larger B-17 and PB4Y tankers. The first conversion of a B-26 was done by Aero Atlas at Red Bluff, California. Unfortunately for the company, the regional chief pilot for the USFS in fire-prone California was predisposed against using the B-26, the P2V or the PB4Y as tankers and would not authorize contracts for those types. The owner of Aero Atlas, after converting two B-26s, sold both aircraft to Oregon operators and closed his tanker business. The effective ban of B-26 tankers continued in Region 5 (California) until 1974. By that late date, though, the B-26 tankers in the USA were few and not many saw any service in the state.

However, other USFS regions held no such ill will toward B-26 air tankers. Several companies in Oregon, including Rosenbalm Aviation at Medford, Central Valley Aerial at Bend and Hillcrest Aviation at La Grande, all operated at least two tankers in Region 6 (Oregon and Washington). By 1963 no fewer than ten B-26s were under USFS contract in the region. Region 3, covering Arizona and New Mexico, had six B-26s under contract in the same year. Operators included Donaire at Deer Valley and Aircraft Specialties at Wilcox, both in Arizona.

B-26 Air Tankers in 1963

Civil	Serial	Tanker #	Operator
N86469	43-22511	F57	Aero Flite, Troutdale, OR
N9301R	44-35872	C12	Aircraft Specialties, Wilcox, AZ
N9423Z	44-34687	F76	Central Oregon Aerial Co., Bend, OR
N9425Z	44-35721	F77	Central Oregon Aerial Co., Bend, OR
N9401Z	44-35524	C33	Donaire, Inc., Deer Valley, AZ
N9996Z	44-35661	C11	Donaire, Inc., Deer Valley, AZ
N4820E	44-35217	C29	Flight Enterprises, Prescott, AZ
N8629E	41-39572	C31	Flight Enterprises, Prescott, AZ
N9159Z	43-22673	F24	Hillcrest Aviation, La Grande, OR
N9161Z	43-22621	F23	Hillcrest Aviation, La Grande, OR
N74874	44-34508	F74	Kreitzberg Aviation, Salem, OR
N8037E	44-35889	C13	Moseley Aviation, Deer Valley, AZ
N3428G	44-35523	F29	Rosenbalm Aviation, Medford, OR
N4819E	44-34609	F57	Rosenbalm Aviation, Medford, OR
N5544V	44-35552	F11	Rosenbalm Aviation, Medford, OR
N7954C	44-35724	F83	Rosenbalm Aviation, Medford, OR



Aero Union, based at Chico, California, operated Tanker 55 in the early 1970s. Flying as N8026E (s/n 44-35323), it was operated by several tanker companies both in Canada and the United States. It was last operated as a tanker in Alaska in the late 1970s and was eventually added to the Planes of Fame collection at Chino, California. It is currently based at the Valle Airport in northern Arizona. Milo Pelzter

Pilots who flew the Invader reportedly enjoyed the performance, the aircraft being at least 25kn (46km/h) faster than the B-25. However, the complaints about visibility that plagued it during its military service followed it into its new role. The giant engine cowlings and nacelles limited the downward view of the pilots as they prepared for their drops. Furthermore, the desirable drop speeds for fire retardant, about 130kn (241km/h), was 15 to 20kn (28 to 37km/h) below the single-engine safe speed for the B-26. Thus, if an engine failed during a critical moment, the pilot had to remove power immediately from his good engine to maintain control of the aeroplane as he was going down. The unreliable nose gear of the B-26 also continued to pose problems for tanker pilots and more than one B-26 tanker landed with the nose gear locked up.

The B-26 tanker none the less enjoyed moderate success through the 1970s and into the 1980s. One of the last big B-26



This B-26B was operated by Comstock, a Canadian company, when this photograph was taken at Baltimore in 1963. Registered as CF-CCR (s/n 44-34550), it eventually was exported to Colombia where it was destroyed in a 1988 accident. Gordon Reid

Current Airspray B-26 Tanker Fleet			
Civil	**Serial**	**Tanker No.**	**Remarks**
CF-AGO	44-35456	36	
CF-CBK	44-35661	11	
CF-EZX	43-22660	3	damaged 29/6/00; parts only
CF-KBM	44-34316	20	
CF-OVC	44-35497	56	
C-FPGF	44-35875	1	
C-FPGP	44-35898	2	
C-FTFB	44-35444	4	
CF-UCI	44-35524	12	
CF-ZTC	44-35857	13	
C-GHCC	44-35893	31	destroyed 16/10/00
C-GHLX	44-35948	32	
C-GHZM	44-34121		added Jan 2001
C-GPTW	43-22653	26	
C-GPUC	44-35810	27	destroyed 16/10/00
C-GTOX	44-34523	14	
C-GWLT	44-34778	98	
C-GWLU	44-34738	8	destroyed 16/10/00
C-GXGY	44-35708	10	
	44-35999		destroyed 10/16/00; parts only

operators was Lynch Air Tankers, based at Billings, Montana. According to the air tanker historian Milo Peltzer, the last recorded American B-26 tanker mission was flown with a Lynch B-26 in 1990, thereby ending out a thirty-year employment. In that time at least two dozen B-26s were converted and operated by a variety of air tanker companies, with about a third of them lost to accidents over the years.

In Canada, however, the B-26 has enjoyed continued service. Two companies have operated the B-26 as tankers there. Conair, based at Abbotsford, British Columbia, began flying the type in the mid-1960s and operated some fifteen B-26 tankers through the late 1980s. The company began to move on to newer equipment in the mid-1980s and now flies Grumman S-2s and a recently converted Convair 580. But perhaps more impressive today is the large fleet of B-26 tankers operated by Airspray from its Red Deer base in Alberta. Airspray is a large company devoted to aerial forest-fire fighting that provides tankers on contract to the provinces of Alberta and British Columbia, as well as the Yukon Forest Service. Besides the sixteen bright yellow B-26s operated since the mid-1970s, the company also operates Lockheed Electras and Canadair CL-215s as tankers. The B-26s are equipped with 760 imperial gallon (3,460ltr) retardant tanks, smaller than those that usually equipped the American tankers but which allow the tanks to be contained completely within the bomb bay. The B-26s are usually operated in groups of two or three, allowing greater versatility in fire fighting. Airspray suffered a disastrous year in 2000. The company lost one of its B-26s in an accident at Grand Prairie, Alberta, in June and suffered a massive hangar explosion and fire at Red Deer that destroyed seven aircraft, including three B-26s, in October.

Test Beds and Research

A number of companies and government agencies found the B-26 a useful tool for testing engines, electronic equipment, aerodynamic controls or in conducting other research. As noted in Chapter 3, the Shell Oil Co. borrowed the USAF XB-26F to test several fuel and lubrication formulations in the early 1950s. The University of Nevada obtained the sole Smith *Tempo* in 1969 for use in weather research and operated it for more than a decade from Reno before it was lost in an accident in 1980.

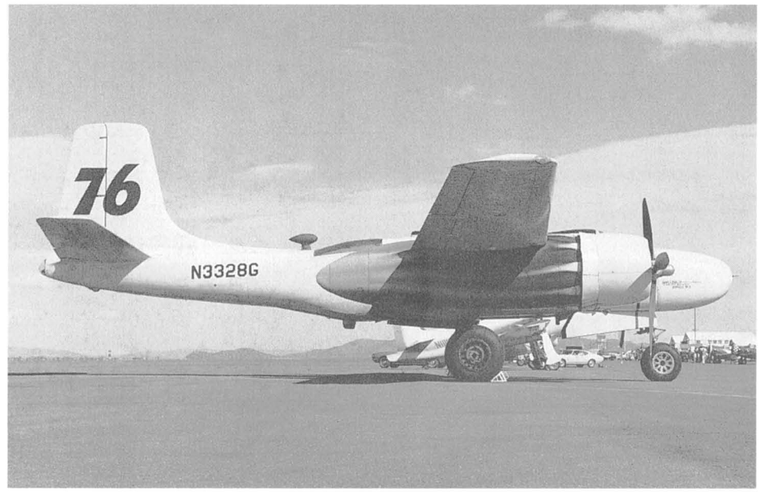
Raytheon, the electronics company, operated one B-26, N67943 (s/n 44-34778), for ten years, beginning in 1955, as a test bed for electronics projects. Based at Hanscom Field, Bedford, Massachusetts, the B-26 was used to carry a variety of radar systems through test profiles for the company. Raytheon also used its B-26 to make emergency dashes across the country to deliver critically needed parts to Boeing and other contractors.

One oddity was a three-engined On Mark *Marksman*, N256H (s/n 41-39221), purchased by the Garrett Corp. in the late 1970s. Operating from the company's test facility on the northern edge of the Phoenix-Sky Harbor Airport in Arizona, the nose section of the already heavily modified B-26 was removed and replaced by an engine mount for test programmes on Garrett engines. The nose-mounted engine could be run in flight to obtain cooling and power readings in a number of configurations. The aircraft remained in service for more than ten years, being operated under the custom registration of N26GT. In 1992 it was donated to a local school district for an educational programme.

The Cornell Aeronautical Laboratory, based at Ithica, New York, operated a pair of B-26s modified for aerodynamics research. Both aircraft, N9146H (s/n 44-34165) and N9147H (44-34653), were equipped as variable stability test beds in 1951 and 1963, respectively, and used for airborne research on control force and stability tests. In 1962 one of the aircraft was used by NASA to conduct control force studies for the planned supersonic transport then under development by Boeing.[141] N9147H was lost in a 1981 accident at Edwards AFB, California, while the other aircraft remains in storage at the same base.

Air Racers

Besides the early post-war participation in the Bendix transcontinental air races, the B-26 also participated in several unlimited air races in the late 1960s and the 1970s. In 1967 John Lear flew his B-26, N3328G (s/n 44-35898), in one of the consolation races at the Reno Air Races. Though it took an exemption from a 21,000lb (9,500kg) weight restriction, Lear flew an average course speed of 284mph (457km/h) and beat a Mustang around the pylons! The next year he participated in the Mojave



One of the B-26 air racers was N3328G (s/n 44-35898), shown here as Racer #76 at the 1967 Reno Air Races. The markings on the nose indicate hat it was owned by Aerospace Flight Research. This aircraft currently flies with Airspray in Alberta, Canada. Birch J. Matthews via AAHS

Air Races in the high desert of southern California, flying the same aircraft. In early 1970 Lear was involved with another B-26 at the California 1000 air race also staged at the Mojave airport. Acting as co-pilot for Wally McDonnell, the pair flew B-26C N2852G (s/n 44-35493) to a twelfth-place finish in the endurance race conducted around a closed pylon course. McDonnell flew a B-26 again in the Mojave Air Races in 1978 and 1979. In the former race he flew N8036E (s/n 44-35696) and, in the latter, his own B-26K, N2294B (s/n 64-17640), believed to be the only time a Counter Invader was ever raced.

Hollywood B-26s

For some reason, the B-26 never really caught the fancy of Hollywood film makers. Perhaps the wartime role of the aircraft was somewhat obscure, though the more likely explanation is that the B-25 was more readily available and slotted well into such productions as *Catch-22* and, more recently, *Pearl Harbor*. The fabled B-17, for good reason, has enjoyed the cinematic spotlight since the World War II air war and the Flying Fortress go together in the public's recollection.

None the less, the B-26 has been included in a few films, usually making only a brief appearance as scene dressing. There was one, however, that featured the B-26 prominently. Directed by Steven Spielberg and released in 1989, *Always* was a remake of the 1943 film *A Guy Named Joe*. The earlier film starred Spencer Tracy as a dead B-25 pilot trying to help his fighter pilot friend get through World War II alive. For the second time around, Richard Dreyfuss, John Goodman and Holly Hunter starred in a similar story about three air tanker pilots, one of whom (Dreyfuss) is killed in a crash but stays around long enough to help a novice tanker pilot learn the ropes.

The film featured a number of operational air tankers, including a pair of B-26s from Lynch Air Tankers of Billings, Montana. Actual air tanker drops were filmed in northern California by the movie pilot Steve Hinton flying a camera-equipped B-25 as the Lynch B-26s worked a fire near Redding in the fall of 1988. Later, the two B-26s, N4818E and N9425Z, as well as a PBY and a C-119, were operated for several weeks in the summer of 1989 from an especially

This A-26A, operated as N2294B (s/n 64-17640) was flown in the Mojave Air Races by Wally McDonnell in 1979. This aircraft is currently displayed at Ellsworth AFB, South Dakota. Scott Thompson



Current US Civil Registered Invaders and Known Status

Serial	Civil	Current Location	Registered Owner	Remarks
43-22275	N114RG		sale reported	
44-34134	N115RG		Sam Sexton	FAB 5176; static display in Brazil
44-34313	N119DR	El Cajon, CA	David R. Lane	airworthy
44-35240	N1221		John P. Coate	last reported 1970
44-34520	N126HP	Greybull, WY	Hawkins and Powers	airworthy(?)
44-34602	N167B	Town and Country, MO	Joda Corp.	Sugarland Express, recently sold
44-35601	N202R	Grand Junction, CO	Lone Star Express	airworthy; Miss Murphy
41-39516	N237Y		sale reported	last reported 1990
41-39427	N240P	Waco, TX	AAHFM	airworthy; Spirit of Waco
64-17640	N267G	Ellsworth AFB, SD	sale reported	display
64-17676	N268G	Wright-Patterson AFB, OH	sale reported	display
44-34526	N26AB	Chapparal, NM	Charles Bella	status?
44-34766	N26BK	Coachella, CA	Thermco Aviation	airworthy?
41-39359	N26BP	Palm Springs, CA	Pond Warbirds	airworthy; for sale, CourtesyAircraft
44-34555	N26HK	Las Cruces, NM	Southwest Aviation, Inc.	status?
41-39161	N26RP			under restoration
44-35918	N2781G	Lackland AFB, TX	not specified	display
44-34616	N300V		sale reported	last reported 1972
44-34755	N3035S		Rebel Aviation	last reported 1976
44-35913	N303WC	Dyess AFB, TX	Guy Counselman	display
44-34726	N3152G		sale reported	last reported 1969
44-34722	N3222T	Tillamook, OR	Jack Erickson	
44-35590	N3248G		Earl Reinhart	storage with Kermit Weeks
44-35523	N3428G	Rantoul, KS	Central Air Services	storage
44-34538	N34538	Santa Ana, CA	Martin Aviation	airworthy, Feeding Frenzy
43-22676	N3709G		sale reported	last reported 1971
43-22612	N3710G		Duane Egli	destroyed, Biggin Hill, UK, 9/21/80
41-39401	N39401	Polk City, FL	Kermit Weeks	under restoration, Aero Trader
44-35326	N401Y	Rockford, IL ?	Tidewater Wings	storage; Courtesy Aircraft Sales, for sale for $99,000
43-22444	N4050A		Hill Air Co.	last reported 1992
41-39344	N4185A		sale reported	last reported 1969
44-34172	N4806E	Southend, UK	A26 Europe	reported in the UK
44-34697	N4807E		MARC	unknown; last c. 1973
44-35888	N4810E		MARC	unknown; last c. 1973
44-35505	N4815E		registration pending	unknown; last at Chino, CA, c. 1988
44-35371	N4818E	Billings, MT	Lynch Air Tankers	airworthy
44-34609	N4819E	Buckeye, AZ	Dawn Adrian	derelict
44-34736	N4821E		sale reported	last reported in 1972; derelict
44-34749	N4959K	Avra Valley, AZ	Abrams Airborne Mfg	airworthy; Puss 'N Boots
64-17679	N4988N	Billings, MT	Lynch Flying Service	airworthy
44-34769	N500MR	Kissimmee, FL	Sea Link Aviation	airworthy; Gator Invader
44-35495	N507WB		Milt Stollak	last reported 1974
44-35552	N5544V		Duane Sly	unknown; last c. 1975
41-39303	N5589A	Santa Rosa, CA	Pacific Coast Air Museum	under restoration
44-35493	N576JB	Santa Teresa, NM	John MacGuire	airworthy?
44-35617	N600WB	Oklahoma		
44-34761	N60XX		sale reported	last reported 1972
43-22281	N61B		sale reported	last reported NAA, crashed c. 1977??
44-35224	N6240D		Milt Stollak	unknown; last c. 1978
44-35643	N626SH	Oklahoma City, OK	AAHFM	dismantled storage
44-34765	N67160	Brussels, Belgium	sale reported	static display at Musee Royal de l'Armee after impound, c. 1972
44-34390	N6836D		Aircraft Associates	last reported 1978
44-35911	N6840D	Wilmington, NC	George Lancaster	airworthy; Bandido
43-22374	N6843D	Chino, CA	Robert Farlow	under restoration at Aero Trader

44-34713	N706ME	Denton, TX	Nostalgia, Inc.	airworthy
44-35562	N7079G	Guthrie, OK	Vintage Aircraft	airworthy; Bar-Belle Bomber
41-39497	N71Y		Jeremiah Boehmer	last reported 1985
41-39154	N73Y		Eastern Aircraft Sales	last reported 1952
414-35580	N74830		Rum Cay Development	last reported 1968
44-35580	N74831		sale reported	last reported 1969
43-22452	N74832		sale reported	last reported 1969.
44-35439	N74833	McMinnville, OR	Evergreen Vintage Aircraft	airworthy
41-39277	N74834		sale reported	last reported 1969
44-34508	N74874	Rantoul, KS	D&D Aero, Inc.	stored at Rantoul?
44-35710	N7705C	Rockford, IL	Historic Invader Aviation	airworthy; Hard to Get; for sale, Courtesy Aircraft Sales, $595,000
44-34628	N7817C		Max Schumacher	last reported 1969
44-35724	N7954C	Rantoul, KS	Central Air Service	storage at Rantoul
44-35780	N8021E		Allied Aircraft Sales	last reported 1992; derelict
44-35323	N8026E	Valle, AZ	Air Museum	airworthy; Ahaulin
44-35345	N8031E		sale reported	last reported 1969; derelict
44-35696	N8036E	Stow, MA	Collings Foundation	airworthy; My Mary Lou
44-35788	N8058E	Van Nuys, CA	A-26 Company, Inc.	airworthy
44-35752	N81797		sale reported	status?; Rude Invader
43-22499	N86841		Consolidated Aircraft Sales	unknown; last c. 1966
41-39486	N90711		J.A. Thompson	unknown; last noted c. 1977
44-35363	N91347		not specified	unknown; no information
41-39517	N91349		not specified	unknown
44-35901	N91351		sale reported	last reported 1992; derelict
44-34774	N917Y	Arlington, WA	Air Station	status?
44-35872	N9301R		Aircraft Specialties	crashed 16/5/69; written off?
41-39190	N9404Z		sale reported	last reported: Conair for parts
44-34328	N9422Z		Ralco, Inc.	last reported 1969
43-22729	N9424Z		F. Conner	last reported 1966
44-35721	N9425Z	Palm Springs, CA	Pond Warbirds	airworthy; Invader
44-34759	N956R		sale reported	last reported 1986 as derelict at Tehran, Iran
41-39230	N9682C	Oklahoma City, OK	AAHFM	airworthy
44-34104	N99420	Fairfield, OH	MARC	under restoration by Historic Aircraft
41-39423	N99422		MARC	in Nicaragua, stored derelict?
41-39162	N99425		MARC	destroyed, hangar fire, 5/17/90
44-35870	N99426		Patrick M. Murphy	status? 1999
43-22602	N9990Z		MARC	last reported at West Palm Beach, Florida, as derelict

constructed tanker base set located at the Libby, Montana, airport. Pilots flying B-26s for the filming included Hinton and Denny Lynch, the owner of Lynch Air Tankers, himself.

One of the memorable scenes was a supposed deadstick landing made by Dreyfuss with a B-26. Hinton related how the scene was shot in an interview in 1989 with the aviation film historian Jim Farmer:

> We didn't actually fly without any engines. We did approaches to the airport with first the right engine feathered and then the left. We had cameras mounted above the fuselage to film each engine feathered as we approached for our landings. We then shot a sequence on the runway itself as if we'd just landed without engines. We'd haul down the runway, get up speed (about 70mph [113km/h]) and feather both engines. We'd then coast down to the other end of the runway and turn off as if we'd just sat down and were rolling out after a deadstick landing. Then they cut the scenes altogether. I guess they were happy with what they got on film.[142]

The B-26 also had a brief stint as a camera platform. Tallmantz Aviation, based at Orange County Airport in southern California, was the major provider of cameraships and aircraft for the film industry from 1960 until the mid-1980s. Formed by the partnership of two veteran Hollywood pilots, Paul Mantz and Frank Tallman, the company was famous for its pair of B-25s equipped with distinctive Cinerama camera noses. Mantz had employed one of the B-25s through the 1950s to film several of the Cinerama features and also had Disney 360-degrees Circlevision cameras mounted in the bomb bay for films produced for Disney amusement parks. After Mantz merged his operation with Tallman, the versatile Tallmantz B-25s were in constant demand. The roomy B-25 allowed Hollywood film makers to mount cameras in the nose, waist and tail positions.

Tallmantz was often hired by film companies under contract to airliner manufacturers and airlines for the production of commercials and other promotional products. Douglas was a major customer, based as it was at nearby Long Beach Airport. Tallmantz B-25s were used



Tallmantz Aviation, based at Orange County Airport at Santa Ana, California, operated B-26C N4815E (s/n 44-35505) as a film camera ship beginning in 1963. The nose glass was a cylindrical section for optical clarity. N4815E was a lesser-known companion to the Cinerama B-25s operated by Tallmantz. Al Hansen

for years to film DC-8s and DC-9s against the Pacific Ocean or the high Sierras of California. According to the late Tallmantz pilot Frank Pine in a 1979 interview, someone at Douglas decided that 'their' Douglas B-26 would also make a good camera platform. Tallman responded to their customer's subtle pressure and purchased N4815E (s/n 44-35505) in October 1962. An especially-constructed Cinerama nose was built for the B-26, featuring an optically-clear cylindrical section of wrap-around glass and enough room to mount motion picture cameras. The nose section was similar to that installed on the B-25s, with a large hatch to allow the bulky cameras to be loaded and required an STC (SA 1069WE) for the modification. Unfortunately, what the B-26 lacked were other camera positions. There was no room to mount cameras in the tail section, a favourite position for aerial directors. The B-26 was used on only a few of the Douglas productions, each effort ending when a B-25 was brought in to complete the job. The Tallmantz B-26 largely languished on the Movieland of the Air ramp at Orange County Airport through the 1960s and the 1970s. It was employed for a few specialized military filming projects but eventually had its special camera nose removed and replaced by a standard B-26C nose section. It was sold in February 1977 and remains on the American civil register, although its current status is unknown.

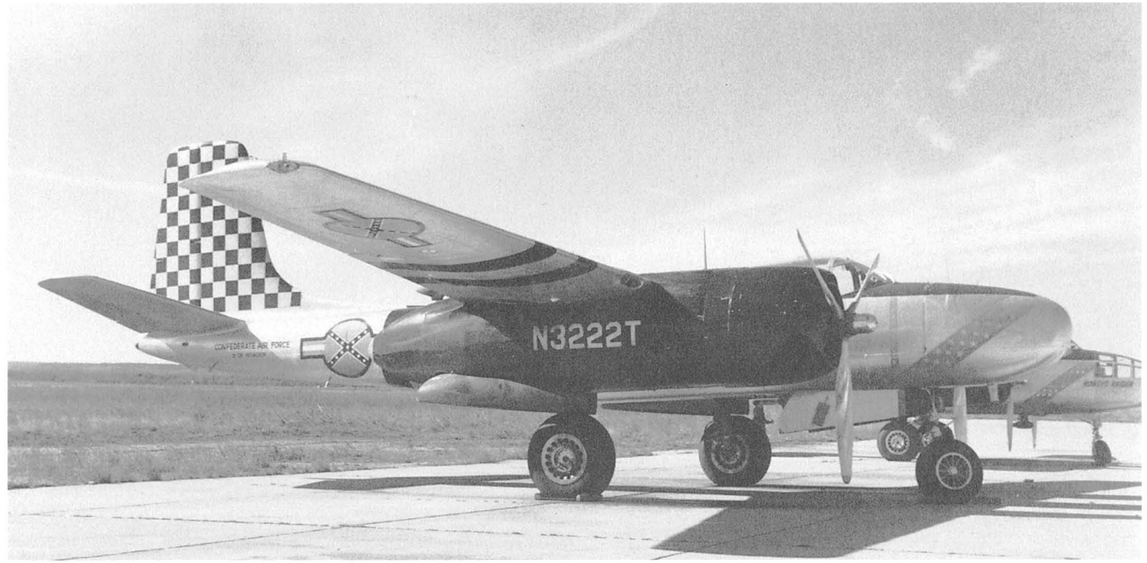
Warbirds

Although the B-26 had the distinction of flying in three American wars, it was slow off the mark when the warbird industry blossomed in the 1970s and the 1980s. Even today the B-26 suffers in popularity when compared with the more famed B-25 for air show crowds, warbird owners and museums. This is despite the fact that a similar number of B-25s and B-26s were released to the civil market and survived through the years. The B-26 commands prices that are 20 per cent less than those of a comparable B-25. Part of the reason is familiarity with the B-25 and its noted war record. The B-25 also was withdrawn from most of the air tanker fleets by 1962, leaving many to descend to derelict condition quickly. The filming of *Catch-22* by Tallmantz Aviation in 1969 quickly saved at least fifteen B-25s and flooded the limited warbird market after the filming was completed. In any event, there are about three B-25s for every B-26 currently operated as warbirds, though that ratio will probably change as the B-26 grows in popularity.

Through the 1950s and the 1960s, old military aircraft were not warbirds; they were tankers, sprayers, transports or test beds. Or, when they were not needed any longer, they were eyesores at local airports as they dripped oil and rotted away. It was not until the mid-1960s that the Confederate Air Force (CAF) and other, similar groups began to popularize the concept of preserving the American aeroplanes of World War II in an airworthy condition. Soon the 'warbirds', as the vintage aircraft became known, began to gain in monetary value and in esteem, in consequence of their history.

The CAF was organized in the mid-1950s as a fun-loving group of duster pilots who loved to beat up Texas airfields in surplus fighters. However, thoughtful heads in the organization soon realized that World War II aircraft were a quickly vanishing breed. After reorganizing around loftier goals, the CAF determined by the early 1960s to purchase and operate examples of all the major fighter and bombers used by the American military in World War II. Based at Rebel Field near Mercedes, Texas, the fighters were fairly easy to obtain. By 1964 the CAF began to seek out the bombers. Soon, both a B-25 and a B-26, N3222T, were on the CAF ramp at Rebel Field. The pair were repainted in the CAF bomber scheme consisting of overall silver with stars and bars featuring the Confederate flag. The CAF B-26 was the first Invader to be obtained and operated solely for the purposes of preservation and display. Though that particular B-26 was exported in 1969 and added to the Salvadoran Air Force for its 'Soccer War' with Honduras (so much for preservation), the CAF has continued to operate a number of B-26s through the years. Their original B-26 survived its stint in El Salvador and eventually rejoined the organization. The CAF, currently based at Midland, Texas and in the process of changing its image and name, still operates two B-26s, with another in storage, in reasonably authentic military paint schemes.

Other groups and individuals have purchased B-26s for restoration and display as warbirds. Many of these operators have as their goal the restoration of their aircraft to a fully authentic military configuration, no easy task given the rarity of gun turrets, electronic components and radios, motors, instruments and all the other items that equipped the standard AAF or USAF Invader. Small companies have come to specialize in the meticulous restoration of these warbirds and are able to locate, with amazing ingenuity, many of these components.



Above: **The first Invader 'warbird' was N3222T (s/n 44-34722) owned and operated by the Confederate Air Force at Brownwood, Texas. This view shows off the CAF bomber scheme of the mid-1960 period, before reasonably authentic military paint and markings became popular. N3222T went to El Salvador in 1969 but returned to an American owner in 1974. It still flies as N3222T and is based at Tillamook, Oregon.** Dick Phillips

Below: **Something of a mystery is civil B-26 is XB-TEL, shown here at Mexico City in December 1963. From its condition, it may have been scrapped shortly afterwards.** Gary Kuhn



One of the major drawbacks in the B-26 restoration process is that so many of the civilian Invaders enjoyed significant modifications by On Mark and other companies eager to turn the military B-26 into an executive transport. Today it is uneconomical and impracticable to try to reverse the process and return an On Mark or Monarch B-26 to a standard configuration. Besides the external changes to the fuselage, the interior structure and wing spar changes make it almost impossible to restore the aircraft. Many of these fly today painted externally to resemble a wartime A-26, but a close examination reveals windows, hatches, antennas, seats, couches and equipment that never graced a Ninth Air Force Invader. None the less, there are still a substantial number of available B-26s that saw little if any conversion work and are restorable to an authentic configuration with patience and a substantial amount of money.

In recent years airworthy B-26s with low-time engines and propellers have been available on the warbird market in the $100,000 to $200,000 range, though these prices seem to be rising. The R-2800 engines are well-supported with parts and overhaul shops, but their costs are also escalating. A top-quality, zero-time overhaul by a reputable engine shop now approaches $50,000, with the propellers adding another $15,000 apiece. Other



Paramount Aquariums operated a number of surplus military airplanes including a B-17 and this B-26C, N7684C (s/n 44-33615), photographed at Oakland, California, in February 1959. The fate of this aircraft is unknown. Larry Smalley via Gordon Reid

mechanical or restorative work on warbirds can be performed by specialized shops with the equipment, manuals and experience to do the work correctly. However, that expertise is also expensive and it quickly becomes clear that although the acquisition costs of an Invader may seem reasonable, its restoration, operating and maintenance costs are not for the faint of heart.

Overseas, the B-26 has enjoyed limited use as a warbird. Several B-26s have appeared in the skies of England since the 1980s, though none has yet entered the civil register. Euroworld operated one, N3710G (s/n 43-22612) beginning in 1978, but it was destroyed in a spectacular crash at the Biggin Hill air show in September 1980. Another B-26 reportedly operating in the United Kingdom is N7079G (s/n 44-35562). One B-26 was operated as *Sugarland Express* by the Scandinavian Historical Flight at Oslo, but this aircraft, N167B (s/n 44-34602), was sold to a new American owner in 2001 and returned across the Atlantic. There are reports of other Invaders being restored in the United Kingdom and France, but none has yet been confirmed as to its status.

At present (early 2002), there remain ninety-two Invaders on the American civil register. However, the listing is seriously out of date; many of the aircraft shown have long since been scrapped, exported or destroyed by accident. Others are on static display at museums but their civil registrations were never cancelled. Some aircraft listed obviously no longer exist, but their fates are unknown. A realistic estimation would suggest that of the ninety-two listed, approximately two dozen B-26s are currently airworthy and flown, another two dozen are in storage or being restored to fly, and perhaps eight are on static display and should be removed from the register. The remaining thirty-six probably no longer exist.

Invaders on Display

Besides the operating warbirds, there are a substantial number of B-26s on static display at military and civilian museums around the world. An informal survey reveals that approximately thirty-five are available for viewing in the United States, with another fifteen at other museums around the world. In the 1980s



A large number of surplus B-26s were flown out of Davis-Monthan AFB to nearby Tucson Municipal Airport in the late 1960s, many of which were parked and never flew again. This Invader, s/n 44-35901, is seen here at Tucson in November 1982 and was registered as N91351. It was reported as derelict as late as 1992 and, though still on the US civil register, was probably scrapped.
Scott Thompson

Invaders on Static Display

Serial No.	Location	Displayed	Remarks
41-39215	NAS Pensecola, FL	US Naval Air Museum	displayed as JD-1 77141
41-39288	Rio de Janiero, Brazil	Museu Aerospacial da FAB	
41-39303	Santa Rosa, CA	Pacific Coast Air Museum	under restoration
41-39472	Atwater, CA	Castle Field Museum	
43-22357	Sidney, BC, Canada	B.C. Aviation Museum	
43-22494	Tucson, AZ	Pima Air Museum	
43-22499	Windsor Locks, CT	New England Air Museum	
43-22652	Travis AFB, CA	Travis Air Museum	
44-34134	Sao Paulo, Brazil	Museum	FAB 5176
44-34156	Vance AFB, OK	Air park	
44-34165	Edwards AFB, CA	Flight Test Historical Museum	storage?
44-34313	Wetaskiwin, Alberta	Reynolds Aviation Museum	
44-34423	Fairchild AFB, WA	Air park	
44-34504	Chateaudun AB, France	Gate guard	
44-34535?	Havana, Cuba		displayed as 'FAR 933'
44-34559	Jackson ANG Base, MS	Air park	displayed on pylon
44-34610	Washington, D.C.	National Air and Space Museum	storage, Dulles Airport
44-34665	Lincoln, NB	SAC Museum	
44-34726	Alverca AB, Portugal	Museo do Air	FAP 7104; reported in storage
44-34741	El Bosque, Chile	Gate guard	FAC 848 (reported)
44-34746	El Reno, OK	Displayed VFW Post 382	
44-34765	Brussels, Belgium	Musee Royal de l'Armee	status?
44-34773	Paris, France	Musee de l'Air	storage?
44-34774	Seattle, WA	Warbirds and Vehicles, Inc.	status?
44-35204	Laughlin AFB, TX		
44-35224	March ARB, CA	March Field Museum	
44-35372	Tucson, AZ	Pima Air Museum	storage
44-35440	Fairfield, CA	Travis Air Museum	
44-35493	Grand Forks AFB, ND		
44-35523	West Fargo, ND	Bonanzaville Museum	
44-35596	Hickam AFB, HI	Air park	status?
44-35617	Hill AFB, UT	Hill Aerospace Museum	
44-35724	Beale AFB, CA	Beale Air Museum	reported derelict
44-35732?	Robins AFB, GA	Air park	
44-35733	Wright-Patterson AFB, OH	USAF Museum	
44-35753	Antofagasta, Chile	Cerro Moreno AB	gate guard (reported as FAC 863)
44-35892	Pueblo, CO	Frank E. Weisbrod Museum	
44-35913	Dyess AFB, TX	Linear Air Park	
44-35918	Lackland AFB, TX	Air park	
44-35923	Louisville, KY	Aircraft Industries Museum	reported
44-35937	New Orleans, LA	Jackson Barracks Museum	
44-35986	Selfridge ANGB, MI	Air park	
64-17640	Ellsworth AFB, SD	South Dakota Air and Space Museum	A-26A
64-17651	Seoul, South Korea	ROKAF Museum	A-26A
64-17653	Tucson, AZ	Pima Air Museum	A-26A
64-17657	High Wycombe, UK	Booker Aircraft Museum	A-26A nose section only (reported)
64-17666	Hurlburt Field, FL	Air park	A-26A, displayed on pylon
64-17671	Florence, SC	Florence Air and Missile Museum	A-26A
64-17676	Dayton, OH	USAF Museum	A-26A
unknown	Yogjakart, Indonesia	Indonesian Air Force Museum	reported as M-265



One of the first B-26s to be memorialized in an air museum was s/n 44-35924, transferred to the USAF Museum in the late 1950s. Records do not indicate the fate of this airframe, however, since it is not currently listed in the museum's collection. This view shows it on display in July 1958. Norman P. Thompson



A number of surplus B-26s were made available as memorials, including this B-26B, s/n 44-34746, currently displayed at Veterans of Foreign Wars Post 382 at El Reno, Oklahoma. Scott Thompson



Above: **With the development of the USAF Museum Heritage Program, individual air force bases were encouraged to develop historical museums in the 1980s and the 1990s. Aero Nostalgia, a company based at Stockton, California, developed a speciality of turning otherwise derelict Invaders into museum displays. This view shows s/n 43-22523 on display at Vance AFB, Oklahoma, in April 1991. It had operated as N4050A through the 1970s but was parked at Fort Lauderdale, Florida and was near scrapping. Aero Nostalgia recovered and rebuilt the civil Invader for static display. Note that the propeller-warning stripe ahead of the cockpit has incorrect spelling, a small but long-standing mistake.** Scott Thompson



A view of N4050A under rebuild at the Aero Nostalgia hangar at Stockton, California, in March 1987. All the civil modifications, including the panoramic windows and fuselage modifications, had to be undone to create a reasonably accurate static display. Scott Thompson

the USAF sought to recognize its history and organized the USAF Museum Heritage Program. This enabled individual air force bases to organize local museums and draw into the inventory and trading ability of the USAF Museum at Wright-Patterson AFB, Ohio. The Heritage Program resulted in a number of B-26s being restored to static display condition. Additionally several B-26s were traded into the Program by owners eager to obtain other aircraft. Finally, the B-26 enjoyed a reputation as a capable drug-running aircraft and a number were seized by US Customs and law enforcement officials. Many of these seized aircraft eventually wound their way through the federal bureaucracy and ended by being assigned to the USAF Heritage Program for display at base museums.

The USAF also set aside B-26s for memorial purposes as they were being withdrawn from military service in the late 1950s and the early 1960s. Many of those on display at USAF museums came direct from Davis-Monthan or a local USAF unit and never operated as a civil aircraft. Overseas, many national air museums had B-26s made available for display when withdrawn from service. This is particularly true in Latin America since the B-26 played a role in several national air forces from the 1950s through the 1970s.

APPENDIX: I

A-26 Production List

Douglas s/n	Fuselage	Series	AAF s/n	No.	Delivered	Remarks
El Segundo Production						
1004		XA-26 (DE)	41-19504	1		prototype
1005		XA-26A (DE)	41-19505	1	prototype	
1006		XA-26B (DE)	41-19588	1	prototype	
Long Beach Production						
6813/6817	1/5	A-26B-1-DL	41-39100/39104	5	Sep 43/Dec 43	
6818/6832	6/20	A-26B-5-DL	41-39105/39119	15	Dec 43/Mar 44	
6833/6852	21/40	A-26B-10-DL	41-39120/39139	20	Mar 44/May 44	
6853/6864	41/52	A-26B-15-DL	41-39140/39151	12	May 44	
6865	53	A-26C-1-DL	41-39152	1	May 44	
6866/6905	54/93	A-26B-15-DL	41-39153/39192	40	Jun 44/Jul 44	
6906	94	A-26C-2-DL	41-39193	1	Jul 44	
6907	95	A-26B-15-DL	41-39194	1	Jul 44	
6908	96	A-26C-2-DL	41-39195	1	Jul 44	
6909/6911	97/99	A-26B-15-DL	41-39196/39198	3	Jul 44	
6912/6913	100/101	A-26C-2-DL	41-39199/39200	2	Jul 44	
6914/7012	102/200	A-26B-20-DL	41-39201/39299	99	Jul 44/Oct 44	
7013/7062	201/250	A-26B-25-DL	41-39300/39349	50	Oct 44-/Nov 44	
7063/7137	251/325	A-26B-30-DL	41-39350/39424	75	Nov 44/Dec 44	
7138/7212	326/400	A-26B-35-DL	41-29425/39499	75	Dec 44	
7213/7312	401/500	A-26B-40-DL	41-39500/39599	100	Dec 44/Jan 45	
27377/27378	501/502	A-26B-45-DL	44-34098/34099	2	Jan 45	
27379	503	A-26B-45-DL	44-34100	1	Jan 45	to A-26D prototype
27380/27496	504/620	A-26B-45-DL	44/34101/34217	117	Jan 45/Mar 45	
27497/27565	621/689	A-26B-50-DL	44-34218/34286	69	Mar 45	
27566	690	A-26B-51-DL	44-34287	1	Mar 45	
27567/27575	691/699	A-26B-50-DL	44-34288/34296	9	Mar 45	
27576/27577	700/701	A-26B-51-DL	44-24297/34298	2	Mar 45	
27578/27601	702/725	A-26B-50-DL	44-34299/34322	24	Apr 45	
27602	726	A-26B-51-DL	44-34323	1	Apr 45	
27603/27605	727/729	A-26B-50-DL	44-34324/34326	3	Apr 45	
27606	730	A-26B-51-DL	44-34327	1	Apr 45	
27607/27609	731/733	A-26B-50-DL	44-34328/34330	3	Apr 45	
27610	734	A-26B-51-DL	44-34331	1	Apr 45	
27611	735	A-26B-50-DL	44-34332	1	Apr 45	
27612/27613	736/737	A-26B-55-DL	44-34333/34334	2	Apr 45	
27614	738	A-26B-56-DL	44-34335	1	Apr 45	
27615/27617	739/741	A-26B-55-DL	44-34336/34338	3	May 45	
27618	742	A-26B-56-DL	44-34339	1	May 45	
27619/27621	743/745	A-26B-55-DL	44-34340/34342	3	May 45	
27622	746	A-26B-56-DL	44-34343	1	May 45	
27623/27625	747/749	A-26B-55-DL	44-34344/34346	3	May 45	
27626	750	A-26B-56-DL	44-34347	1	May 45	
27627/27629	751/753	A-26B-55-DL	44-34348/34350	3	May 45	
27630	754	A-26B-56-DL	44-34351	1	Apr 45	
27631/27642	755/766	A-26B-55-DL	44-34352/34363	12	May 45	

Douglas s/n	Fuselage	Series	AAF s/n	No.	Delivered	Remarks
27643	767	A-26B-56-DL	44-34364	1	May 45	
27644/27646	768/770	A-26B-55-DL	44-34365/34367	3	May 45	
27647	771	A-26B-56-DL	44-34368	1	May 45	
27648/27650	772/774	A-26B-55-DL	44-34369/34371	3	May 45	
27651	775	A-26B-56-DL	44-34372	1	May 45	
27652/27655	776/779	A-26B-55-DL	44-34373/34376	4	May 45	
27656	780	A-26B-56-DL	44-34377	1	May 45	
27657/27660	781/784	A-26B-55-DL	44-34378/34381	4	May 45	
27661	785	A-26B-56-DL	44-34382	1	May 45	
27662/27665	786/789	A-26B-55-DL	44-34383/34386	4	May 45	
27666	790	A-26B-56-DL	44-34387	1	Jun 45	
27667/27671	791/795	A-26B-55-DL	44-34388/34392	5	Jun 45	
27672	796	A-26B-56-DL	44-34393	1	Jun 45	
27673/27677	797/801	A-26B-55-DL	44-34394/34398	5	Jun 45	
27678	802	A-26B-56-DL	44-34399	1	Jun 45	
27679/27683	803/807	A-26B-55-DL	44-34400/34404	5	Jun 45	
27684	808	A-26B-56-DL	44-34405	1	Jun 45	
27685/27687	809/811	A-26B-55-DL	44-34406/34408	3	Jun 45	
27688	812	A-26B-56-DL	44-34409	1	Jun 45	
27689/27691	813/815	A-26B-55-DL	44-34410/34412	3	Jun 45	
27692	816	A-26B-56-DL	44-34413	1	Jun 45	
27693/27695	817/819	A-26B-55-DL	44-34414/34416	3	Jun 45	
27696	820	A-26B-56-DL	44-34417	1	Jun 45	
27697/27698	821/822	A-26B-55-DL	44-34418/34419	2	Jun 45	
27699	823	A-26B-56-DL	44-34420	1	Jun 45	
27700/27701	824/825	A-26B-55-DL	44-34421/34422	2	Jun 45	
27702	826	A-26B-56-DL	44-34423	1	Jun 45	
27703/27751	827/875	A-26B-55-DL	44-34424/34472	49	Jun 45	
27752/27756	876/880	A-26B-60-DL	44-34473/34477	5	Jun 45	
27757	881	A-26B-61-DL	44-34478	1	Jun 45	
27758/27759	882/883	A-26B-60-DL	44-34479/34480	2	Jun 45	
27760	884	A-26B-61-DL	44-34481	1	Jun 45	
277961/27762	885/886	A-26B-60-DL	44-34482/34483	2	Jun 45	
27763	887	A-26B-61-DL	44-34484	1	Jun 45	
27764/27765	888/889	A-26B-60-DL	44-34485/34486	2	Jun 45	
27766	890	A-26B-61-DL	44-34487	1	Jun 45	
27767/27768	891/892	A-26B-60-DL	44-34488/34489	2	Jun 45	
27769	893	A-26B-61-DL	44-34490	1	Jun 45	
27770/27771	894/895	A-26B-60-DL	44-34491/34492	2	Jun 45	
27772	896	A-26B-61-DL	44-34493	1	Jun 45	
27773/27774	897/898	A-26B-60-DL	44-34494/34495	2	Jun 45	
27775	899	A-26B-61-DL	44-34496	1	Jun 45	
27776/27777	900/901	A-26B-60-DL	44-34497/34498	2	Jun 45	
27778	902	A-26B-61-DL	44-34499	1	Jun 45	
27779/27780	903/904	A-26B-60-DL	44-34500/34501	2	Jun 45	
27781	905	A-26B-61-DL	44-34502	1	Jun 45	
27782/27783	906/907	A-26B-60-DL	44-34503/34504	2	Jun 45	
27784	908	A-26B-61-DL	44-34505	1	Jun 45	
27785/27786	909/910	A-26B-60-DL	44-34506/34507	2	Jun 45	
27787	911	A-26B-61-DL	44-34508	1	Jun 45	
27788/27789	912/913	A-26B-60-DL	44-34509/34510	2	Jun 45	
27790	914	A-26B-61-DL	44-34511	1	Jun 45	
27791/27792	915/916	A-26B-60-DL	44-34512/34513	2	Jun 45	
27793	917	A-26B-61-DL	44-34514	1	Jun 45	
27794/27795	918/919	A-26B-60-DL	44-34515/34516	2	Jun 45	
27796	920	A-26B-61-DL	44-34517	1	Jun 45	

Douglas s/n	Fuselage	Series	AAF s/n	No.	Delivered	Remarks
27797/27798	921/922	A-26B-60-DL	44-34518/34519	2	Jun 45	
27799	923	A-26B-61-DL	44-34520	1	Jun 45	
27800	924	A-26B-60-DL	44-34521	1	Jun 45	
27801/27864	925/988	A-26B-61-DL	44-34522/34585	64	Jun 45/Jul 45	
27865	989	XA-26F (DL)	44-34586	1	Dec 45	
27866/27896	990/1020	A-26B-61-DL	44-34587/34617	31	Jul 45/Aug 45	
27897/28032	1021/1156	A-26B-66-DL	44-34618/34753	136	Jul 45/Aug 45	
28033/28038	1157/1162	A-26B (DL)	44-34754/34759	(6)	Jul 45/Aug 45	not delivered; to RFC
28039	1163	A-26B-71-DL	(44-34760)	(1)	—	cancelled
28040/28053	1164/1177	A-26B (DL)	44-34761/34774	(14)	Jul 45/Aug 45	not delivered; to RFC
28054	1178	A-26B-71-DL	(44-34775)	(1)	—	cancelled
28055	1179	A-26B-71-DL	44-34776	1	3/46	not XA-26D; stored and delivered 3/15/46
28056/28057	1180/1181	A-26B (DL)	44-34777/34778	(2)	Jul 45/Aug 45	not delivered; to RFC
28058	1182	A-26B (DL)	44-34779	(1)	—	cancelled
28059/28476	(1183/1600)	A-26B (DL)	(44-34780/35197)	(418)	—	cancelled
36929/37328	(1601/2000)	A-26D (DL)	(45-2239322792)	(400)	—	cancelled
40579/40928	(2001/2350	A-26D (DL)	(45-54825/55174)	(350)	—	cancelled
			Tulsa Production			
18399/18413	1/15	A-26B-5-DT	43-22252/22266	15	Mar 44/May 44	
18414/18448	16/50	A-26B-10-DT	43-22267/22301	35	May 44/Aug 44	
18449/18450	51/52	A-26B-15-DT	43-22302/22303	2	Aug 44	
18451	53	A-26C-16-DT	43-22304	1	Aug 44	
18452/18454	54/56	A-26B-15-DT	43-22305/22307	3	Aug 44	
18455/18459	57/61	A-26C-16-DT	43-22308/22312	5	Aug 44	
18460/18492	62/94	A-26B-15-DT	43-22313/22345	33	Aug 44/Sep 44	
18493/18496	95/98	A-26C-16-DT	43-22346/22349	4	Sep 44	
18497/18498	99/100	A-26B-15-DT	43-22350/22351	2	Oct 44	
18499	101	A-26C-15-DT	43-22467	1	Oct 44	
18500/18502	102/104	A-26B-15-DT	43-22352/22355	3	Oct 44	
18503	105	A-26C-15-DT	43-22468	1	Oct 44	
18504/18506	106/108	A-26B-15-DT	43-22356/22358	3	Oct 44	
18507	109	A-26C-15-DT	43-22469	1	Oct 44	
18508/18510	110/112	A-26B-15-DT	43-22358/22360	3	Oct 44	
18511	113	A-26C-15-DT	43-22470	1	Oct 44	
18512/18513	114/115	A-26B-15-DT	43-22361/22362	2	Oct 44	
18514	116	A-26C-15-DT	43-22471	1	Oct 44	
18515/18516	117/118	A-26B-15-DT	43-22363/22364	2	Oct 44	
18517	119	A-26C-15-DT	43-22472	1	Oct 44	
18518/18519	120/121	A-26B-15-DT	43-22365/22366	2	Oct 44	
18520	122	A-26C-15-DT	43-22473	1	Oct 44	
18521	123	A-26B-15-DT	43-22367	1	Oct 44	
18522	124	A-26C-15-DT	43-22474	1	Oct 44	
18523/18524	125/126	A-26B-15-DT	43-22368/22369	2	Oct 44	
18525	127	A-26C-15-DT	43-22475	1	Oct 44	
18526/18527	128/129	A-26B-15-DT	43-22370/22371	2	Oct 44	
18528	130	A-26C-15-DT	43-22476	1	Oct 44	
18529	131	A-26B-15-DT	43-22372	1	Oct 44	
18530	132	A-26C-15-DT	43-22477	1	Oct 44	
18531/18532	133/134	A-26B-15-DT	43-22373/22374	2	Oct 44	
18533	135	A-26C-15-DT	43-22478	1	Oct 44	
18534/18535	136/137	A-26B-15-DT	43-22375/22376	2	Oct 44	
18536	138	A-26C-15-DT	43-22479	1	Oct 44	
18537	139	A-26B-15-DT	43-22377	1	Oct 44	
18538	140	A-26C-15-DT	43-22480	1	Oct 44	
18539/18540	141/142	A-26B-15-DT	43-22378/22379	2	Oct 44	

Douglas s/n	Fuselage	Series	AAF s/n	No.	Delivered	Remarks
18541	143	A-26C-15-DT	43-22481	1	Oct 44	
18542/18543	144/145	A-26B-15-DT	43-22380/22381	2	Oct 44	
18544	146	A-26C-15-DT	43-22482	1	Oct 44	
18545	147	A-26B-15-DT	43-22382	1	Oct 44	
18546	148	A-26C-15-DT	43-22483	1	Oct 44	
18547/18548	149/150	A-26B-15-DT	43-22383/22384	2	Oct 44	
18549	151	A-26C-15-DT	43-22484	1	Oct 44	
18550/18551	152/153	A-26B-15-DT	43-22385/22386	2	Oct 44	
18552	154	A-26C-15-DT	43-22485	1	Oct 44	
18553	155	A-26B-15-DT	43-22387	1	Oct 44	
18554	156	A-26C-15-DT	43-22486	1	Oct 44	
18555/18556	157/158	A-26B-15-DT	43-22388/22389	2	Nov 44	
18557	159	A-26C-15-DT	43-22487	1	Nov 44	
18558/18559	160/161	A-26B-15-DT	43-22390/22391	2	Nov 44	
18560	162	A-26C-15-DT	43-22488	1	Nov 44	
18561	163	A-26B-15-DT	43-22392	1	Nov 44	
18562	164	A-26C-15-DT	43-22489	1	Nov 44	
18563/18564	165/166	A-26B-15-DT	43-22393/22394	2	Nov 44	
18565	167	A-26C-15-DT	43-22490	1	Nov 44	
18566/18567	168/169	A-26B-15-DT	43-22395/22396	2	Nov 44	
18568	170	A-26C-15-DT	43-22491	1	Nov 44	
18569	171	A-26B-15-DT	43-22397	1	Nov 44	
18570	172	A-26C-15-DT	43-22492	1	Nov 44	
18571	173	A-26B-15-DT	43-22398	1	Nov 44	
18572	174	A-26C-15-DT	43-22493	1	Nov 44	
18573	175	A-26B-15-DT	43-22399	1	Nov 44	
18574/18648*	176/250*	A-26C-20-DT	43-22494/22531	38	Nov 44/Dec 44	
18575/18647**	177/249**	A-26B-20-DT	43-22400/22436	37	Nov 44/Dec 44	
18649	251	A-26B-20-DT	43-22437	1	Dec 44	
18650/18651	252/253	A-26C-20-DT	43-22532/22533	2	Dec 44	
18652	254	A-26B-20-DT	43-22438	1	Dec 44	
18653/18654	255/256	A-26C-20-DT	43-22534/22535	2	Dec 44	
18655	257	A-26B-20-DT	43-22439	1	Dec 44	
18656/18657	258/259	A-26C-20-DT	43-22536/22537	2	Dec 44	
18658	260	A-26B-20-DT	43-22440	1	Dec 44	
18659/18660	261/262	A-26C-20-DT	43-22538/22539	2	Dec 44	
18661	263	A-26B-20-DT	43-22441	1	Dec 44	
18662/18663	264/265	A-26C-20-DT	43-22540/22541	2	Dec 44	
18664	266	A-26B-20-DT	43-22442	1	Dec 44	
18665/18666	267/268	A-26C-20-DT	43-22542/22543	2	Dec 44	
18667	269	A-26B-20-DT	43-22443	1	Dec 44	
18668/18669	270/271	A-26C-20-DT	43-22544/22545	2	Dec 44	
18670	272	A-26B-20-DT	43-22444	1	Dec 44	
18671/18672	273/274	A-26C-20-DT	43-22546/22547	2	Dec 44	
18673	275	A-26B-20-DT	43-22445	1	Dec 44	
18674/18675	276/277	A-26C-20-DT	43-22548/22549	2	Dec 44	
18676	278	A-26B-20-DT	43-22446	1	Dec 44	
18677/18678	279/280	A-26C-20-DT	43-22550/22551	2	Dec 44	
18679	281	A-26B-20-DT	43-22447	1	Dec 44	
18680/18681	282/283	A-26C-20-DT	43-22552/22553	2	Dec 44	
18682	284	A-26B-20-DT	43-22448	1	Dec 44	
18683/18684	285/286	A-26C-20-DT	43-22554/22555	2	Dec 44	
18685	287	A-26B-20-DT	43-22449	1	Jan 45	
18686/18687	288/289	A-26C-20-DT	43-22556/22557	2	Dec 44	
18688/	290	A-26B-20-DT	43-22450	1	Dec 44	
18689/18690	291/292	A-26C-20-DT	43-22558/22559	2	Dec 44	
18691	293	A-26B-20-DT	43-22451	1	Dec 44	
18692/18693	294/295	A-26C-20-DT	43-22560/22561	2	Dec 44	

Douglas s/n	Fuselage	Series	AAF s/n	No.	Delivered	Remarks
18694	296	A-26B-20-DT	43-22452	1	Jan 45	
18695/18696	297/298	A-26C-20-DT	43-22562/22563	2	Jan 45	
18697	299	A-26B-20-DT	43-22453	1	Jan 45	
18698	300	A-26C-20-DT	43-22564	1	Jan 45	
18699	301	A-26C-25-DT	43-22565	1	Dec 44	
18700	302	A-26B-25-DT	43-22454	1	Dec 44	
18701/18702	303/304	A-26C-25-DT	43-22566/22567	2	Jan 45	
18703	305	A-26B-25-DT	43-22455	1	Jan 45	
18704/18705	306/307	A-26C-25-DT	43-22568/22569	2	Jan 45	
18706	308	A-26B-25-DT	43-22456	1	Jan 45	
18707/18708	309/310	A-26C-25-DT	43-22570/22571	2	Dec 44/Jan 45	
18709	311	A-26B-25-DT	43-22457	1	Jan 45	
18710/18711	312/313	A-26C-25-DT	43-22572/22573	2	Jan 45	
18712	314	A-26B-25-DT	43-22458	1	Jan 45	
18713/18714	315/316	A-26C-25-DT	43-22574/22575	2	Jan 45	
18715	317	A-26B-25-DT	43-22459	1	Jan 45	
18716/18717	318/319	A-26C-25-DT	43-22576/22577	2	Jan 45	
18718	320	A-26B-25-DT	43-24560	1	Jan 45	
18719/18720	321/322	A-26C-25-DT	43-22578/22579	2	Jan 45	
18721	323	A-26B-25-DT	43-24561	1	Jan 45	
18722/18723	324/325	A-26C-25-DT	43-22580/22581	2	Jan 45	
18724	326	A-26B-25-DT	43-22462	1	Jan 45	
18725/18726	327/328	A-26C-25-DT	43-22582/22583	2	Jan 45	
18727	329	A-26B-25-DT	43-22463	1	Jan 45	
18728/17829	330/331	A-26C-25-DT	43-22584/22585	2	Jan 45	
18730	332	A-26B-25-DT	43-22464	1	Jan 45	
18731/18732	333/334	A-26C-25-DT	43-22586/22587	2	Jan 45	
18733	335	A-26B-25-DT	43-22465	1	Jan 45	
18734/18735	336/337	A-26C-25-DT	43-22588/22589	2	Jan 45	
18736	338	A-26B-25-DT	43-22466	1	Jan 45	
18737/18898	339/500	A-26C-25-DT	43-22590/22751	162	Jan 45/Mar 45	
28477/28636	501/660	A-26C-30-DT	44-35198/35357	160	Mar 45/May 45	
28637/28836	661/860	A-26C-35-DT	44-35358/35557	200	Mar 45/May 45	
28837/28841	861/865	A-26C-40-DT	44-35558/35562	5	Mar 45/May 45	
28842	866	A-26E (DT)	44-35563	1		A-26E prototype
28843/28934	867/958	A-26C-40-DT	44-35564/35651	88	May 45	Army/Navy program
28935/28938	959/962	A-26C-40-DT	44-35652/35655	4	May 45/Jul 45	
28939/29061	963/1085	A-26C-45-DT	44-35656/35782	127	May 45/Jun 45	
29062/29216	1086/1240	A-26C-50-DT	44-35783/35937	155	Jun 45/Jul 45	
29217/29226	1241/1250	A-26C-55-DT	44-35938/35947	10	Jul 45/Aug 45	
29227/29231	1251/1255	A-26C-55-DT	44-35948/35952	(5)	Jul 45	not delivered; to RFC
29232	1256	A-26C-55-DT	44-35953	1	Jul 45	delivered – then to RFC?
29233	1257	A-26C-55-DT	44-39354	(1)	—	cancelled; not completed
29234	1258	A-26C-55-DT	44-35955	1	Jul 45	
29235	1259	A-26C-55-DT	44-35956	(1)	—	cancelled; not completed
29236/29275	1260/1299	A-26C-55-DT	44-35957/35996	40	Jul 45	
29276/29284	1300/1308	A-26C (DT)	44-35997/36005	(9)	Jul 45	not delivered; scrapped
29285/29288	1309/1312	A-26C (DT)	(44-36006/36009)	(4)	—	cancelled; not completed
29289/29290	1313/1314	A-26C (DT)	44-36010/36011	(2)	Jul 45	not delivered; scrapped
29291/29304	1315/1328	A-26C (DT)	(44-36012/36025)	(14)	—	cancelled; not completed
29305/29339	1329/1363	A-26C (DT)	44-36026/36060	(35)	Jul 45	not delivered; scrapped
29340/29341	1364/1365	A-26C (DT)	(44-36061/36062)	(2)	—	cancelled; not completed
29342	1366	A-26C (DT)	44-36063	(1)	Jul 45	not delivered; scrapped
29343/29376	1367/1400	A-26C (DT)	(44-36064/36097)	(34)	—	cancelled
29377/30076	1401/2100	A-26C (DT)	(44-36098/36797)	(700)	—	cancelled
37329/39328	2101/4100	A-26E (DT)	(45-17343/19342)	(2000)	—	cancelled
41604/42853	4101/5350	A-26E (DT)	(45-53575/54824)	(1250)	—	cancelled

*even numbers
**odd numbers

APPENDIX: II

Civil Invaders

AAF s/n	msn	Designation	Civil Registration Series	Remarks
41-39136	6849	A-26B	N15565	
41-39154	6867	A-26B	N73Y	to France
41-39161	6874	A-26B	N1470V, N317V, N317W, N26RP	
41-39162	6875	A-26B	N72Y (to France), N99425	
41-39163	6876	A-26B	N2022A, N2DD, N61B, N161Q	
41-39186	6899	A-26B	N5245V	
41-39190	6903	A-26B	N9404Z	
41-39203	6916	A-26B	N3244G	
41-39215	6928	A-26B	N5272V, N5292V, N4000M, N200M, N142ER	
41-39221	6934	A-26B	N9636C, N256H (#1), N26GT	
41-39223	6936	A-26B	N74Y	to France
41-39230	6943	A-26B	N9682C	
41-39262	6975	A-26B	N5510V, PI-C877	PI-C877 reported
41-39267	6980	A-26B	N5271V	
41-39277	6990	A-26B	N74834	
41-39298	7011	A-26B	N74830	
41-39303	7016	A-26B	N5589A	
41-39320	7033	A-26B	N107H	
41-39322?	7035?	A-26B	XB-BUI	
41-39340	7053	A-26B	N4186A	
41-39344	7057	A-26B	N4185A	
41-39353	7066	A-26B	N5280V	
41-39359	7072	A-26B	N91281, CF-BMR, N26BP	
41-39398	7111	A-26B	N91317*, CF-DFC	*earmarked for Portugal; not delivered
41-39401	7114	A-26B	N3457G, N39401	
41-39410	7123	A-26B	N2827G	
41-39418	7131	A-26B	N7937A, N116RG	
41-39422	7135	A-26B	N91357	earmarked for Portugal; not delivered
41-39423	7136	A-26B	N99422	
41-39427	7140	A-26B	N75Y, N240P	
41-39437	7150	A-26B	N7938A, N117R	
41-39467	7180	A-26B	N6844D	
41-39468	7181	A-26B	N91354	earmarked for Portugal; not delivered
41-39472	7185	A-26B	N86482, N26VC	
41-39483	7196	A-26B	N91358	earmarked for Portugal; not delivered
41-39486	7199	A-26B	N9432Z, N90711	
41-39497	7210	A-26B	N71Y	
41-39505	7218	A-26B	N67Y	
41-39507	7220	A-26B	N99420	
41-39509	7222	A-26B	N3480G	
41-39512	7225	A-26B	N68Y	to France
41-39515	7228	A-26B	N62Y, N67805	
41-39516	7229	A-26B	N237Y	
41-39517	7230	A-26B	N91349	to Portugal as FAP 7106
41-39527	7240	A-26B	N65Y	
41-39531	7244	A-26B	N64Y, N12756	

AAF s/n	msn	Designation	Civil Registration Series	Remarks
41-39539	7252	A-26B	N70Y	to France, also reported as 41-29358
41-39546	7259	A-26B	F-BNTM, ZS-EUT, F-BLCM	
41-39553	7266	A-26B	N9405Z	
41-39555	7268	A-26B	N103C	
41-39561	7274	A-26B	N6837D	
41-39567	7280	A-26B	N5029K	
41-39572	7285	A-26B	N8629E	
41-39596	7309	A-26B	64-17676, N268G, C-GXTF, N22939, N268G	
43-22258	18405	A-26B	N1469V, N94445	
43-22275	18422	A-26B	N114RG, N4973N	
43-22281	18428	A-26B	N1436V, N94A, N61B	
43-22314	18461	A-26B	N4637V	
43-22357	18506	A-26B	N91348*, CF-BMS	*earmarked for Portugal; not delivered
43-22374	18532	A-26B	N6843D	
43-22378	18539	A-26B	N7719C	FAA reports as 43-22392
43-22386	18551	A-26B	N7752B	
43-22412	18599	A-26B	N74832	
43-22416	18607	A-26B	N100Y, N190Y, N40XY	
43-22427	18629	A-26B	N91350	to Portugal as FAP 7105
43-22440	18658	A-26B	N86489	
43-22444	18670	A-26B	N4050A	
43-22452	18694	A-26B	N3685G	
43-22499	18584	A-26C	N86481	also reported as 43-22530?
43-22505	18596	A-26C	N9419Z, HP-333	
43-22511	18608	A-26C	N86469	
43-22528	18642	A-26C	N9438Z, N36B, N61A	
43-22533	18651	A-26C	N6845D	
43-22559	18690	A-26C	N91359	earmarked for Portugal; not delivered
43-22569	18705	A-26C	N3478G	
43-22578	18719	A-26C	N6755C	
43-22602	18749	A-26C	N9990Z	
43-22609	18756	A-26C	N6756C	
43-22612	18759	A-26C	N3710G	
43-22615	18762	A-26C	F-BMJQ	
43-22616	18763	A-26C	N3491G	
43-22621	18768	A-26C	N9161Z	
43-22636	18783	A-26C	N3490G	
43-22647	18794	A-26C	N8023E	
43-22649	18796	A-26C	64-17657, N62104, N99218	
43-22652	18799	A-26C	N8018E, C-GHCE	
43-22653	18800	A-26C	N9402Z, C-GPTW	
43-22660	18807	A-26C	N9087Z, N3711G, CF-EZX	
43-22668	18815	A-26C	N3691G	to Nicaragua as FAN 602?
43-22673	18820	A-26C	N9159Z, C-GHLM	
43-22676	18823	A-26C	N3709G	
43-22690	18837	A-26C	N3487G	
43-22696	18843	A-26C	N5035K, N85W	
43-22712	18859	A-26C	N2880G, YV-E-GPA	
43-22729	18876	A-26C	N9424Z	
43-22730	18877	A-26C	N8027E	
43-22856	18731	A-26C	N3489G	to Indonesia, M-261?
44-34102	27381	A-26B	N4060A	
44-34104	27383	A-26B	N9484Z*, N99420?	*to Nicaragua as FAN 420 and 604(?)
44-34121	27400	A-26B	N4805E, C-GHZM	
44-34127	27406	A-26B	N4214A	
44-34134	27413	A-26B	N4974N, N115RG	to Brazil as FAB 5176

AAF s/n	msn	Designation	Civil Registration Series	Remarks
44-34136	27415	A-26B	N8017E, C-FKBM	
44-34146	27425	A-26B	N5426E	
44-34148	27427	A-26B	N6842D	
44-34153	27432	A-26B	N8022E	
44-34156	27435	A-26B	XB-COM, XC-CAZ, N190M	
44-34165	27444	A-26B	N9146H	
44-34172	27451	A-26B	N4806E	
44-34198	27477	A-26B	64-17679, N269G, C-GXTG, N4988N	
44-34206	27485	A-26B	N86479	to Nicaragua as FAN 422
44-34211	27490	A-26B	N8024E	
44-34312	27591	A-26B	F-BMJR	
44-34313	27592	A-26B	N5457V, C-GHLK, N119DH	
44-34328	27607	A-26B	N9422Z	to Portugal as FAP 7102
44-34344	27623	A-26B	N91356	earmarked for Portugal; not delivered
44-34376	27655	A-26B	HP-323	
44-34390	27669	A-26B	N6836D	
44-34415	27694	A-26B	N5002X, N900V, N46598	
44-34423	27702	A-26B	N9594Z, C-GHLI	
44-34427	27706	A-26B	N4712C	
44-34508	27787	A-26B	N74874	
44-34520	27799	A-26B	N9420Z, C-GHCF, N9420Z*, N126HP	*also reported as N94207
44-34523	27802	A-26B	N9174Z, C-GTOX	
44-34524	27803	A-26B	N58Y, N588, HK-999E	
44-34526	27805	A-26B	N9178Z, N827W, N551EH, N400V, N7977, N26AB	
44-34535	27814	A-26B	N8020E, FAP 7101	
44-34538	27817	A-26B	N6839D, N34538	
44-34550	27829	A-26B	N7769C, CF-CCR, N355Q, HK-1247W, HK-1247P	
44-34555	27834	A-26B	N841W, N84W, N5BP, N550, N26HK	
44-34567	27846	A-26B	N9412Z, ZS-CVD	
44-34568	27847	A-26B	N202PP, AP-AVV	
44-34581	27860	A-26B	N8038E	
44-34586	27865	A-26B	N66368	
44-34590	27869	A-26B	N5000X, N19777	
44-34592	27871	A-26B	N8631E, C-FFJG	
44-34602	27881	A-26B	N8392H, N167B	
44-34603	27882	A-26B	N3157G	
44-34607	27886	A-26B	N8395H, CF-FBV	
44-34609	27888	A-26B	N4819E	
44-35615	28894	A-26C	N7684C	Paramount Aquariums
44-34612	27891	A-26B	N4814E	
44-34615	27894	A-26B	N4817E	to Brazil as FAB 5173
44-34616	27895	A-26B	N2890D, N300V	
44-34624	27903	A-26B	N7451C, N6101C	
44-34628	25907	A-26B	N7817C	
44-34642	27921	A-26B	N8626E	
44-34650	27929	A-26B	N9162Z	
44-34653	27932	A-26B	N9417H	
44-34659	27938	A-26B	N9163Z	
44-34669	27948	A-26B	N8630E	
44-34672	27951	A-26B	?HP-319	
44-34674	27953	A-26B	N9143R	
44-34687	27966	A-26B	N9423Z	
44-34697	27976	A-26B	N4807E	
44-34708	27987	A-26B	N4808E	
44-34710	27989	A-26B	N9148H	
44-34713	27992	A-26B	N5538V, N36B, N706ME, N26MR, N26WB, N706ME	
44-34722	28001	A-26B	N62289, N3222T*, N3222T	*to El Salvador as FAS 600

AAF s/n	msn	Designation	Civil Registration Series	Remarks
44-34724	28003	A-26B	N7662C, C-FBVH	
44-34725	28004	A-26B	N4824E	
44-34726	28005	A-26B	N3152G, FAP 7104	
44-34733	28012	A-26B	N65779, N9875C	
44-34736	28015	A-26B	N4821E	
44-34738	28017	A-26B	N9861C, N600D, N808D, C-GWLU	
44-34749	28028	A-26B	N4823E*, N4823E, N4959K	*to Brazil as FAB 5174
44-34752	28031	A-26B	N9853C	
44-34754	28033	A-26B	N66662, N666	
44-34755	28034	A-26B	N67839, N256H (#2), N3035S	
44-34756	28035	A-26B	N65157, YV-C-CTV	
44-34757	28036	A-26B	N67907	
44-34758	28037	A-26B	N67908	to France
44-34759	28038	A-26B	N67834, N28W, N956, N956R	
44-34760	28039	A-26B	N951?	msn card only
44-34761	28040	A-26B	N67158, N400E, N60XY, N60XX	
44-34762	28041	A-26B	N67880, N4000, N4000K	
44-34763	28042	A-26B	N65779	
44-34764	28043	A-26B	N67159	
44-34765	28044	A-26B	N67160, D-CAFY (ntu), N67160	
44-34766	28045	A-26B	N67807, N1243, N910G?, N910H?, N9150, N26BK	
44-34767	28046	A-26B	N67161	to France
44-34768	28047	A-26B	N4852V	
44-34769	28048	A-26B	N67162, N25S?, N29711, N500M, N500MR	
44-34770	28049	A-26B	N67814	
44-34773	28052	A-26B	N67944	to France
44-34774	28053	A-26B	N67163, N163Y, N910Y, N917Y	
44-34777	28056	A-26B	N66661, N1242, N910F, N919P	
44-34778	28057	A-26B	N67943, C-GWLT	
44-35198	29197	A-26C	N7953C, TI-1040L, TI-1040P, HR-276, N2781G	
44-35201	28480	A-26C	N137WG, N8025E, N437W	
44-35217	28496	A-26C	N4820E, C-FFIM	
44-35224	28503	A-26C	N9421Z, N6240D	
44-35238	28517	A-26C	N3477G	
44-35240	28519	A-26C	N122Y, N1221	
44-35242	28521	A-26C	HP-318, HP-322	
44-35244	28523	A-26C	N2881G	
44-35245	28524	A-26C	LN-AER	
44-35262	28541	A-26C	N72404	
44-35267	28546	A-26C	N8034E	
44-35271	28550	A-26C	N4809E	
44-35323	28602	A-26C	N8026E, CF-CDD, N8026E	
44-35326	28605	A-26C	N2889D, N40Y, N401Y	
44-35345	28624	A-26C	N8031E	
44-35358	28637	A-26C	N7774C	
44-35363	28642	A-26C	N91347	to Portugal as FAP 7107
44-35365	28644	A-26C	N91353	earmarked for Portugal; not delivered
44-35366	28645	A-26C	N5273V, N5294V	
44-35371	28650	A-26C	N4818E	
44-35372	28651	A-26C	N8028E	
44-35385	28664	A-26C	N91352	earmarked for Portugal; not delivered
44-35425	28704	A-26C	N3427G	
44-35427	28706	A-26C	N5267V	
44-35439	28718	A-26C	N74833	
44-35440	28719	A-26C	N6838D, C-FMSB	
44-35444	28723	A-26C	N7656C, C-FTFB	

AAF s/n	msn	Designation	Civil Registration Series	Remarks
44-35456	28735	A-26C	N330WC, C-FAGO	
44-35457	28736	A-26C	F-BMKT, ZS-ESX, F-BLCN	
44-35466	28745	A-26C	N8019E	
44-35493	28772	A-26C	N2852G, N576JB	
44-35495	28774	A-26C	N2076A, N501N, N507WB	
44-35497	28776	A-26C	N3426G, CF-OVC	
44-35505	28784	A-26C	N4815E	
44-35523	28802	A-26C	N3428G	
44-35524	28803	A-26C	N9401Z, C-FCUI	
44-35541	28820	A-26C	N8032E	
44-35552	28831	A-26C	N5544V	
44-35562	28841	A-26C	N9176Z, N707TG, N7079G	
44-35580	28859	A-26C	N74831	
44-35581	28860	A-26C	N3485G, C-GWJG	
44-35582	28861	A-26C	N7659C	
44-35590	28869	A-26C	N3248G	
44-35596	28875	A-26C	N5636V	
44-35601	28880	A-26C	N202R	
44-35607	28886	A-26C	F-BNTN	
44-35609	28888	A-26C	N8030E	
44-35617	28896	A-26C	N7660C, N600WB	
44-35622	28901	A-26C	N9658C, D-BELE, D-CELE	
44-35631	28910	A-26C	N91346	to Portugal as FAP 7103
44-35637	28916	A-26C	N8040E	
44-35638	28917	A-26C	N7824B, D-BELI, D-CELI	
44-35640	28919	A-26C	N4204A	
44-35643	28922	A-26C	N6841D, C-GCES, N8015H, N226RW	
44-35653	28932	A-26C	N3476G	
44-35661	28940	A-26C	N9996Z, C-FCBK	
44-35671	28950	A-26C	N8033E	
44-35676	28955	A-26C	N91355	earmarked for Portugal; not delivered
44-35678	28957	A-26C	N3650A	
44-35681	28960	A-26C	N60Y, N160Y, N168Y, CF-VPR	
44-35682	28961	A-26C	N5181V, D-CADU	
44-35696	28975	A-26C	N8036E	
44-35698	28977	A-26C	HP-318-P, N5001X, N800V	
44-35708	28987	A-26C	N5530V, C-GXGY	
44-35710	28989	A-26C	N7705C	
44-35721	29000	A-26C	N9425Z	
44-35724	29003	A-26C	N7954C	
44-35725	29004	A-26C	N800W	
44-35752	29031	A-26C	N8672E, C-FKBZ, N81797	
44-35756	29035	A-26C	N3479G	
44-35759	29038	A-26C	N5588A	
44-35780	29059	A-26C	N8021E	
44-35788	29067	A-26C	N8058E	
44-35808	29087	A-26C	N8041E	
44-35810	29089	A-26C	N9403Z, C-GPUC	
44-35830	29009	A-26C	N7745B	
44-35857	29136	A-26C	N9300R, CF-ZTC	
44-35858	29137	A-26C	N8039E	
44-35860	29139	A-26C	N8049E	
44-35867	29146	A-26C	N8035E	
44-35870	29149	A-26C	N320, N99426	
44-35872	29151	A-26C	N9301R	
44-35875	29154	A-26C	N4816E, C-FPGF	

AAF s/n	msn	Designation	Civil Registration Series	Remarks
44-35880	29159	A-26C	N8048E	
44-35886	29165	A-26C	N7194C	
44-35888	29167	A-26C	N4810E	
44-35889	29168	A-26C	N8037E	
44-35891	29170	A-26C	N34962	
44-35892	29171	A-26C	N4811E	
44-35893	29172	A-26C	N4812E, C-GHCC	
44-35896	29175	A-26C	64-17640, N267G, N2294B, N267G	
44-35898	29177	A-26C	N3328G, C-FPGP	
44-35901	29180	A-26C	N91351	earmarked for Portugal; not delivered
44-35905	29184	A-26C	N9400Z	
44-35910	29189	A-26C	N26A	
44-35911	29190	A-26C	N6840D	
44-35913	29192	A-26C	N3522G, N303W, N303WC	
44-35918	29197	A-26C	N7953C, TI-1040L, TI-104P*, HR-786, N2781G	*to Honduras as FAH 510
44-35921	29200	A-26C	N3704G	
44-35938	29217	A-26C	N4203A, N510X, N510A, N516X, D-BACA	
44-35948	29227	A-26C	N67164, N1244, N910H, N161H, C-GHLX	
44-35949	29228	A-26C	N67165	
44-35950	29229	A-26C	N67148	
44-35951	29230	A-26C	N33674, N37493	
44-35952	29231	A-26C	N67166, N1S, N4984N	
44-35953	29232	A-26C	N67150, XB-KUX	
44-35955	29234	A-26C	N8394H, N2923Y	
44-35956	29235	A-26C	N37482	
44-35964	29243	A-26C	N4813E	
44-35969	29248	A-26C	N8628E	to Brazil as FAB 5175
44-35986	29265	A-26C	N6382T	
44-35994	29273	A-26C	N4822E	
44-35999	29278	A-26C	N5052N, N52NM, XB-SIJ, C-GQPZ	
?	?	?	CF-CXX	reported; no information
?	?	?	XB-TEL	unknown
None			N18RS	reported; no FAA record
None			N2FC	reported; no FAA record
None			N4856V	reported; no FAA record
None			N587	reported; no FAA record
?	?	?	N62990	reported; no FAA record
None			N7160	reported; no FAA record
?	?	?	N8029E	unknown
None			N815	reported; no FAA record
None			N9536E	reported; no FAA record

APPENDIX: III

Civil Registrations Assigned

Civil	S/N
AP-AVV	44-34568
CF-AGO	44-35456
CF-BMR	41-39359
CF-BMS	43-22357
CF-BVH	44-34724
CF-CBK	44-35661
CF-CCR	44-34550
CF-CDD	44-35323
C-FCUI	44-35524
CF-CXX	no information
CF-DFC	41-39398
CF-EZX	43-22660
CF-FBV	44-34607
CF-FIM	44-35217
CF-FJG	44-34592
CF-KBM	44-34136
CF-KBZ	44-35752
CF-MSB	44-35440
CF-OVC	44-35497
C-FPGF	44-35875
CF-PGP	44-35898
CF-TFB	44-35444
CF-VPR	44-35681
CF-ZTC	44-35857
C-GCES	44-35643
C-GHCC	44-35893
C-GHCE	43-22652
C-GHCF	44-34520
C-GHLI	44-34423
C-GHLK	44-34313
C-GHLM	43-22673
C-GHLX	44-35948
C-GHZM	44-34121
C-GPTW	43-22653
C-GPUC	44-35810
C-GQPB	44-35999
C-GTOX	44-34523
C-GWJG	44-35581
C-GWLT	44-34778
C-GWLU	44-34738
C-GXGY	44-35708
C-GXTF	41-39596
C-GXTG	44-34198
D-BACA	44-35938
D-BELE	44-35622
D-BELI	44-35638
D-CADU	44-35682
D-CAFY	44-34765

Civil	S/N
D-CELE	44-35622
D-CELI	44-35638
FAH 510	44-35918
F-BLCM	41-39546
F-BLCN	44-35457
F-BMJQ	43-22615
F-BMJR	44-34312
F-BMKT	44-35457
F-BNTM	41-39546
F-BNTN	44-35607
HK-1247P	44-34550
HK-1247W	44-34550
HK-999E	44-34524
HP-318	44-35242
HP-318-P	44-35698
HP-319	44-34672
HP-322	44-35242
HP-323	44-34376
HP-333	43-22505
HR-276	44-35918
LN-AER	44-35245
N100Y	43-22416
N103C	41-39555
N107H	41-39320
N1144	no information
N114RG	43-22275
N115RG	44-34134
N116RG	41-39418
N117R	41-39437
N119DH	44-34313
N1221	44-35240
N122Y	44-35240
N1242	44-34777
N1243	44-34766
N1244	44-35948
N126HP	44-34520
N12756	41-39531
N137WG	44-35201
N142ER	41-39215
N1436V	43-22281
N1469V	43-22258
N1470V	41-39161
N15565	41-39136
N160Y	44-35681
N161H	44-35948
N161Q	41-39163
N163Y	44-34774
N167B	44-34602

Civil	S/N
N168Y	44-35681
N18RS	no information
N190M	44-34156
N190Y	43-22416
N19777	44-34590
N1S	44-35952
N200M	41-39215
N202PP	44-34568
N202R	44-35601
N2076A	44-35495
N226RW	44-35643
N22939	41-39596
N2294B	44-35896
N237Y	41-39516
N240P	41-39427
N256H	41-39221
N256H	44-34755
N25S?	44-34769
N267G	44-35896
N267G	44-35896
N268G	41-39596
N268G	41-39596
N269G	44-34198
N26A	44-35910
N26AB	44-34526
N26BK	44-34766
N26BP	41-39359
N26GT	41-39221
N26HK	44-34555
N26MR	44-34713
N26RP	41-39161
N26VC	41-39472
N26WB	44-34713
N26WB	44-34713
N2781G	44-35918
N2827G	41-39410
N2852G	44-35493
N2880G	43-22712
N2881G	44-35244
N2889D	44-35326
N2890D	44-34616
N28W	44-34759
N2923Y	44-35955
N29711	44-34769
N2DM	unknown
N2FC	no information
N300V	44-34616
N3035S	44-34755

Civil	S/N
N303W	44-35913
N303WC	44-35913
N3152G	44-34726
N3157G	44-34603
N317V	41-39161
N317W	41-39161
N320	44-35870
N3222T	44-34722
N3244G	41-39203
N3248G	44-35590
N330WC	44-35456
N3328G	44-35898
N33674	44-35951
N3426G	44-35497
N3427G	44-35425
N3428G	44-35523
N34538	44-34538
N3457G	41-39401
N3476G	44-35653
N3477G	44-35238
N3478G	43-22569
N3479G	44-35756
N3480G	41-39509
N3485G	44-35581
N3487G	43-22690
N3489G	43-22856
N3490G	43-22636
N3491G	43-22616
N34962	44-35891
N35225	44-35913
N355Q	44-34550
N3650A	44-35678
N3685G	43-22452
N3691G	43-22668
N36B	43-22258
N36B	44-34713
N3704G	44-35921
N3709G	43-22676
N3710G	43-22612
N3711G	43-22660
N37482	44-35956
N37493	44-35951
N39401	41-39401
N4000	44-34762
N4000K	44-34762
N4000M	41-39215
N400E	44-34761
N400V	44-34526

Civil	S/N
N401Y	44-35326
N4050A	43-22444
N4060A	44-34102
N40XY	43-22416
N40Y	44-35326
N4185A	41-39344
N4186A	41-39340
N4203A	44-35938
N4204A	44-35640
N4214A	44-34127
N437W	44-35201
N4637V	43-22314
N46598	44-34415
N4712C	44-34427
N4805E	44-34121
N4806E	44-34172
N4807E	44-34697
N4808E	44-34708
N4809E	44-35271
N4810E	44-35888
N4811E	44-35892
N4812E	44-35893
N4813E	44-35964
N4814E	44-34612
N4815E	44-35505
N4816E	44-35875
N4817E	44-34615
N4818E	44-35371
N4819E	44-34609
N4820E	44-35217
N4821E	44-34736
N4822E	44-35994
N4823E	44-34749
N4824E	44-34725
N4852V	44-34768
N4856V	no information
N4959K	44-34749
N4973N	43-22275
N4974N	44-34134
N4984N	44-35952
N4988N	44-34198
N5000X	44-34590
N5001X	44-35698
N5002X	44-34415
N500M	44-34769
N500MR	44-34769
N501N	44-35495
N5029K	41-39567
N5035K	43-22696
N5052N	44-35999
N507WB	44-35495
N510A	44-35938
N510X	44-35938
N516X	44-35938
N5181V	44-35682
N5245V	41-39186

Civil	S/N
N5267V	44-35427
N5271V	41-39267
N5272V	41-39215
N5272V	41-39215
N5273V	44-35366
N5280V	41-39353
N5294V	44-35366
N52NM	44-35999
N5426E	44-34146
N5457V	44-34313
N550	44-34555
N5510V	41-39262
N551EH	44-34526
N5530V	44-35708
N5538V	44-34713
N5544V	44-35552
N5588A	44-35759
N5589A	41-39303
N5636V	44-35596
N576JB	44-35493
N587	no information
N588	44-34524
N58Y	44-34524
N5BP	44-34555
N600D	44-34738
N600WB	44-35617
N60XX	44-34761
N60XY	44-34761
N60Y	44-35681
N6101C	44-34624
N61A	43-22528
N61B	43-22281
N62Y	41-39515
N62104	43-22649
N62289	44-34722
N62290	no information
N6240D	44-35224
N626SH	44-35643
N6382T	44-35986
N64Y	41-39531
N65779	44-34733
N65779	44-34763
N65Y	41-39527
N66368	44-34586
N666	44-34754
N66661	44-34777
N66662	44-34754
N67148	44-35950
N67150	44-35953
N67157	44-34756
N67158	44-34761
N67159	44-34764
N67160	44-34765
N67160	44-34765
N67161	44-34767
N67162	44-34769

Civil	S/N
N67163	44-34774
N67164	44-35948
N67165	44-35949
N67166	44-35952
N6755C	43-22578
N6756C	43-22609
N67805	41-39515
N67807	44-34766
N67814	44-34770
N67834	44-34759
N67839	44-34755
N67880	44-34762
N67907	44-34757
N67908	44-34758
N67943	44-34778
N67944	44-34773
N67Y	41-39505
N6836D	44-34390
N6837D	41-39561
N6838D	44-35440
N6839D	44-34538
N6840D	44-35911
N6841D	44-35643
N6842D	44-34148
N6843D	43-22374
N6844D	41-39467
N6845D	43-22533
N68Y	41-39512
N706ME	44-34713
N7079G	44-35562
N707TG	44-35562
N70Y	41-39539
N7160	no information
N7194C	44-35866
N71Y	41-39497
N72404	44-35262
N72Y	41-39162
N73Y	41-39154
N74830	41-39298
N74831	44-35580
N74832	43-22412
N74833	44-35439
N74834	41-39277
N74874	44-34508
N74Y	41-39223
N75Y	41-39427
N7656C	44-35444
N7659C	44-35582
N7662C	44-34724
N7684C	44-35615
N7705C	44-35710
N7719C	43-22378
N7745B	44-35830
N7752B	43-22386
N7769C	44-34550
N7774C	44-35358

Civil	S/N
N7824B	44-35638
N7937A	41-39418
N7938A	41-34918
N7953C	44-35918
N7954C	44-35724
N7977	44-34526
N800V	44-35698
N800W	44-35725
N8015H	44-35643
N8017E	44-34136
N8018E	43-22652
N8019E	44-35466
N8020E	44-34535
N8021E	44-35780
N8022E	44-34153
N8023E	43-22647
N8024E	44-34211
N8025E	44-35201
N8026E	44-35323
N8026E	44-35323
N8027E	43-22730
N8028E	44-35372
N8029E	unknown
N8030E	44-35609
N8031E	44-35345
N8032E	44-35541
N8033E	44-35671
N8034E	44-35267
N8035E	44-35867
N8036E	44-35696
N8037E	44-35889
N8038E	44-34581
N8039E	44-35858
N8040E	44-35637
N8041E	44-35808
N8048E	44-35880
N8049E	44-35860
N8058E	44-35788
N808D	44-34738
N815	no information
N81797	44-35752
N827W	44-34526
N8392H	44-34602
N8394H	44-35955
N8395H	44-34607
N841W	44-34555
N84W	44-34555
N85W	43-22696
N8626E	44-34642
N8628E	44-35969
N8629E	41-39572
N8630E	44-34669
N8631E	44-34592
N86469	43-22511
N86479	44-34206
N86481	43-22530

Civil	S/N
N86482	41-39472
N86489	43-22440
N8672E	44-35752
N900V	44-34415
N90711	41-39486
N9087Z	43-22660
N910F	44-34777
N910G?	44-34766
N910H	44-35948
N910H?	44-34766
N910Y	44-34774
N91281	41-39359
N91317	41-39398
N91346	44-35631
N91347	44-35363
N91348	43-22357
N91349	41-39517
N91350	43-22427
N91351	44-35901
N91352	44-35385
N91353	44-35365
N91354	41-39468
N91355	44-35676
N91356	44-34344

Civil	S/N
N91357	41-39422
N91358	41-39483
N91359	43-22559
N9143R	44-34674
N9146H	44-34165
N9148H	44-34710
N9150	44-34766
N9159Z	43-22673
N9161Z	43-22621
N9162Z	44-34650
N9163Z	44-34659
N9167Z	44-35562
N9174Z	44-34523
N917Y	44-34774
N919P	44-34777
N9300R	44-35857
N9301R	44-35872
N9400Z	44-35905
N9401Z	44-35524
N9402Z	43-22653
N9403Z	44-35810
N9404Z	41-39190
N9405Z	41-39553
N9412Z	44-34567

Civil	S/N
N9417H	44-34653
N9419Z	43-22505
N9420Z	44-34520
N9421Z	44-35224
N9422Z	44-34328
N9423Z	44-34687
N9424Z	43-22729
N9425Z	44-35721
N9432Z	41-39486
N9438Z	43-22528
N94445	43-22258
N9484Z	44-34104
N94A	43-22281
N951	44-34760
N9536E	no information
N956	44-34759
N956R	44-34759
N9594Z	44-34423
N9658C	44-35622
N9682C	41-39230
N9853C	44-34752
N9861C	44-34738
N9875C	44-34733
N99218	43-22649

Civil	S/N
N99420	41-39507
N99420	44-34104
N99422	41-39423
N99425	41-39162
N99426	44-35870
N9990Z	43-22602
N9996Z	44-35661
PI-C877	41-39262
TI-1040L	44-35918
TI-1040P	44-35918
XB-BUI	41-39322?
XB-COM	44-34156
XB-KUX	44-35953
XB-PEK	unknown
XB-SIJ	44-35999
XB-TEL	unknown
XC-CAZ	44-34156
YV-C-CTV	44-34756
YV-E-GPA	43-22712
ZS-CVD	44-34567
ZS-CVD	44-34520
ZS-ESX	44-35457
ZS-EUT	41-39546

Notes

1. Anderson, Fred, *Northrop, An Aeronautical History* (Northrop Corporation, 1976), p.1
2. Hunter, Eileen, *El Segundo: Seventy-five Years* (H2 Limited, 1991), p.174
3. Heinemann, Edward H. and Rausa, Rosario, *Ed Heinemann – Combat Aircraft Designer* (Naval Institute Press, 1980), p.18
4. Hunter, *El Segundo*, p.175
5. 'Douglas Plant Playing Part in World Affairs', *El Segundo Herald*, 11 April 1940
6. Heinemann and Rausa, *Ed Heinemann*, p.19
7. 'Plane Plant Is Closed Here', *El Segundo Herald*, 9 September 1937
8. *Case History of the A-26 Airplane* (Historical Division, Air Technical Service Command, Wright Field, October 1945; from: USAF HRC microfilm reel A2062), Correspondence from the Wright Field Engineering Section to Douglas Aircraft, 5 November 1940 (document 1)
9. Heinemann and Rausa, *Ed Heinemann*, p.70
10. *Case History*, Correspondence from Douglas Aircraft to the Wright Field Contract Office, 28 January 1941 (document 3)
11. Ibid.
12. Ibid.
13. Ibid., Memorandum from the Wright Field Engineering Section to the Wright Field Contract Section, 13 February 1941 (document 5)
14. Ibid., Internal memorandum at Langley, 7 February 1941 (document 4)
15. Ibid., Contract proposal from Douglas Aircraft, 23 February 1941 (document 6)
16. Ibid., Memorandum report of the mockup team, 22 April 1941 (document 7)
17. Ibid.
18. Ibid., Contract proposal from Douglas Aircraft, 30 July 1941 (document 13)
19. Craven, Wesley F. and Cate, James L. (eds), *Army Air Forces in World War II*, Vol.VI: *Men and Planes* (University of Chicago Press, 1955), p.309
20. Francillion, René, *McDonnell-Douglas Aircraft since 1920* (Naval Institute Press, 1988), p.25
21. Craven and Cate, *Army Air Forces in World War II*, p.312
22. *Case History*, Correspondence from Douglas Aircraft to the Materiel Center, 8 May 1942 (document 17)
23. Ibid., Memorandum from the Wright Field Production Engineering Section to the Materiel Command, 9 May 1942 (document 18)
24. Ibid., Memorandum report from the Wright Field Production Engineering Section, 9 June 1942 (document 22)
25. Ibid.
26. Heinemann and Rausa, *Ed Heinemann*, p.76.
27. Case History, Memorandum from the Wright Field Procurement Division to Douglas Aircraft, 22 February 1943 (document 43)
28. Ibid., Letter from the Production Engineering Section to Douglas, 3 September 1942 (document 27)
29. Ibid., Memorandum from the Production Engineering Section to the Materiel Command, 31 October 1942 (document 31)
30. Ibid., Letter from the Production Engineering Section to Douglas, 4 December 1942 (document 31)
31. Ibid., Letter from the Engineering Division to Douglas, 8 December 1942 (document 33)
32. Ibid., Technical Instructions issued by the Materiel Command, 30 December 1942 (document 37)
33. Ibid., Letter from Douglas to the Materiel Command, January 11, 1943 (document 39)
34. Ibid., Letter from the Procurement Division to Douglas, 22 February 1943 (document 43)
35. Ibid., Letter from the Engineering Division to Douglas, 22 February 1943 (document 44)
36. Craven and Cate, *Army Air Forces in World War II*, p. 341.
37. *Case History*, Letter from War Procurement District to the AAF Commanding General, 11 April 1944 (document 62)
38. Ibid.
39. Ibid.
40. Ibid.
41. Ibid., Letter from the Materiel Command to the Air Staff, 3 March 1944 (document 55)
42. Ibid., Memorandum from Operations, Commitments, and Requirements to the Air Staff, 19 May 1944 (document 64)
43. Ibid.
44. Ibid., Memorandum from the Engineering Division to the Production Engineering Section, 18 May 1944 (document 65)
45. Ibid., Memorandum from the Engineering Division to the Production Engineering Section, 13 June 1944 (document 66)
46. Ibid., Memorandum from the Production Division to the Procurement Division, 28 September 1944 (document 72)
47. Ibid., Memorandum from Operations, Commitments and Requirements to the Air Staff, 19 October 1944 (document 78)
48. Ibid.
49. Ibid., Memorandum from the Bombardment Branch to the Production Section, 16 October 1944 (document 77)
50. Ibid., Teletype from the Production Section to the Production Branch, 30 September 1944 (document 73)
51. Ibid., Teletype from the Commanding General, AAF, to the Air Technical Service Command, 9 October 1944 (document 75)
52. Ibid., Teletype from the Production Section to the Production Branch, 23 November 1944 (document 81)
53. Hagedorn, Dan and Hellström, Leif, *Foreign Invaders – The Douglas Invader in Foreign Military and US Clandestine Service* (Midland Publishing, 1994), p.12
54. Case History, Memorandum from Operations, Commitments, and Requirements to the Air Staff, 26 November 1944 (document 83)
55. Ibid., Memorandum from the Procurement Division to the Chief of Administration, 26 December 1944 (documents 88)
56. Ibid.
57. Ibid.
58. Ibid., Letter from the Ninth Bombardment Division to the Commanding General, AAF, 4 January 1945 (document 89)
59. Ibid., Letter from the Engineering Division to the Project Engineering Division, 25 January 1945 (document 92)
60. Ibid., Memorandum from the Chief of Administration to the Production Branch, 22 February 1945 (document 97)
61. Ibid., Letter from the Engineering Division to the Project Engineering Division, 25 January 1945 (document 92)
62. Ibid.
63. Ibid., Letter from the Procurement Division to Douglas, 17 April 1945 (document 103)
64. Ibid.
65. Ibid., Contract details, 5 April 1945 (document 100)
66. Ibid., Contract details, 13 April 1945 (document 101)
67. Ibid., Memorandum from the Assistant Secretary of War to the Deputy Commander, AAF, 9 May 1945 (document 104)
68. Ibid., Memorandum from Operations, Commitments, and Requirements to the Deputy Commander, AAF, 16 May 1945 (document 105)
69. Ibid.
70. Ibid., Letter from the Contracting Officer to Douglas, 31 May 1945 (document 106)
71. Ibid., Memorandum from the Procurement Division to the Production Section, 5 June 1945 (document 107)
72. Ibid.
73. Ibid., Technical Instructions issued on 24 July 1945 (document 111)
74. Ibid., Teletype from the Procurement Division to Douglas, 10 August 1945 (document 113)
75. Ibid., Technical Instructions issued on 24 July 1945 (document 111)
76. Ibid., Cablegram from FEAF to the War Department, 15 July 1945 (document 110)
77. Ibid., Memorandum from the Production Section to Procurement Division, 17 August 1945 (document 116)
78. Ibid., Memorandum from the Terminating Section to the Resources Division, 13 August 1945 (document 114)
79. Ibid.
80. Ibid., Letter from the Contracting Officer to Douglas, 27 August 1945 (document 119)
81. Ibid., Teletype from the Procurement Division to the Air Staff, 7 June 1945 (document 108)
82. Ibid., Memorandum from the Production Section to the Production Section, 3 September 1945 (document 120)
83. Ibid., Memo from the Procurement Division to the Engineering Division, 3 September 1945 (document 121)
84. Ibid., Letter from Douglas to the Procurement Division, 3 October 1945 (document 123)
85. Ibid.
86. Ibid.
87. Ibid.
88. Ibid., Letter from the Aircraft Section to Douglas, 31 October 1945 (document 124)
89. Ibid., Letter from the Western Procurement District to the Engineering Division, 3 October 1945 (document 122)
90. *A-26B Airplane Characteristics*, Memorandum from Douglas chief engineer, 17 August 1944.
91. Case History, Memorandum from the A-26 Liaison Officer to the AAF Materiel Command, 29 July 1944 (document 67)
92. Ibid.
93. Ibid.
94. *The Oral Memoir of General John P. Henebry* (interviewed by Frank DeLeo, 4 April 1997, Oral History Archive, American Airpower Heritage Museum, Midland, Texas)
95. Ibid.
96. Ibid.
97. Ibid.
98. *Case History*, Memorandum from the Assistant Chief of Air Staff (Operations, Commitments, and Requirements) to the Deputy Chief of Air Staff, 1 May 1944 (document 64)
99. Ibid., Memorandum from the Commanding General, Ninth Air Force, to the Commanding General, US Strategic Forces in Europe, 5 October 1944 (document 74)
100. Ibid., Memorandum from the Assistant Chief of Air Staff (Operations, Commitments, and Requirements) to the Chief of Air Staff, 19 October 1944 (document 78)
101 Ibid., Memorandum from Assistant Chief of Air Staff (Operations, Commitments, and Requirements) to the Chief of Air Staff, 26 November 1944 (document 83)
102. Ibid.
103. Ibid., Memorandum from the Assistant Secretary of War to the Deputy Commander, AAF, 16 May 1945 (document 105)
104. Craven and Cate, *Army Air Forces in World War II*, p.692
105. Clarke, R. Wallace, 'Red Stocking', *FlyPast*, November 1999
106. USAFE Scrap and Surplus Property Disposal.
107. 'Returning Airplanes to the States', at: www.web-birds.com/9th/returning.html
108. Trester, Dorothy, *History of the AF Storage and Withdrawal Program 1945–1952* (Historical Division, Office of Information Services, Air Materiel Command, Wright-Patterson AFB, OH, April 1954), p.9
109. Mitchell, Rick, *A History of the District of Columbia Air National Guard*, Andrews AFB, Maryland; District of Columbia Air National Guard, 1996, p.13
110. Gross, Charles, *The Air National Guard and the American Military Tradition* (National Guard Bureau, 1995), p.70
111. Futrell, Robert Frank, *The United States Air Force in Korea, 1950–1953* (Duell, Sloan & Pearce, 1961), p.5
112. Trester, *History of the AF Storage and Withdrawal Program*, pp.84–6
113. Ibid.
114. Kendziora, Dave, *History of Hill AFB* (History Office, Hill AFB, 1988), p.76
115. Ibid.
116. Ibid.
117. Knaack, Marcelle Size, *Encyclopedia of US Air Force Aircraft and Missile Systems*, Vol. II, *Post-World War II Bombers 1945–1973* (Office of Air Force History, 1988), pp.466–78
118. Jamison, Theodore R., 'Nightmare of the Korean Hills: Douglas B-26 Invader Operations in the Korean War, 1950–1953', *Journal of the American Aviation Historical Society*, Summer 1989, p.83
119. Futrell, *The United States Air Force in Korea*, p.362
120. Ibid.
121. Ibid., p.423
122. Ibid.
123. Jamison, 'Nightmare of the Korean Hills', p.89
124. Futrell, *The United States Air Force in Korea*, p.425
125. Ibid., p.298
126. Ibid., p.68
127. Jamison, 'Nightmare of the Korean Hills', p.89
128. Futrell, *The United States Air Force in Korea*, p.361
129. Thompson, Warren, *B-26 Invader Units over Korea* (Osprey Publishing, 2000), p.72
130. Ibid., p.54
131. Jamison, 'Nightmare of the Korean Hills' p.90
132. 'First B-26K Delivery Planned Next Month', *Aviation Week and Space Technology*, 18 May 1964
133. *Jane's All the World's Aircraft, 1967–1968* (McGraw-Hill Book Co., 1967)
134. 'On Mark Rebuilds B-26s', *Aviation Week and Space Technology*, 14 May 1956
135. *Jane's All the World's Aircraft, 1957–1958* (McGraw-Hill Book Co., 1957)
136. *Jane's All the World's Aircraft, 1967–1968* (McGraw-Hill Book Co., 1964)
137. 'B-26 Conversion Has Rebuilt Fuselage', *Aviation Week and Space Technology*, 24 October 1960
138. 'LeTourneau to Offer B-26 Conversion', Aviation Week and Space Technology, 16 March 1959
139. 'Volitan Converting Douglas B-26s to 9-16 Passenger Transports', *Aviation Week and Space Technology*, 27 July 1959
140. *Jane's All the World's Aircraft, 1960–1961* (McGraw-Hill Book Co., 1960)
141. Hoffman, David H., 'B-26 Will Simulate Supersonic Transport', *Aviation Week and Space Technology*, 17 September 1962
142. Farmer, James H., 'The Making of Always', *Air Classics*, February 1990

Bibliography

Books

Allen, Richard Sanders, *The Northrop Story, 1929–1939* (Schiffer, 1993)

Anderson, Fred, *Northrop, An Aeronautical History* (Northrop Corporation, 1976)

Chapman, John and Goodall, Geoff, *Warbirds Directory* (Warbirds Worldwide, 1992)

Craven, Wesley F. and Cate, James L.(eds), *Army Air Forces in World War II*, Vol.VI: *Men and Planes* (University of Chicago Press, 1955)

Fahey, James C., *USAF Aircraft 1947–1956* (Air Force Museum Foundation, 1978)

Francillion, René, *McDonnell-Douglas Aircraft since 1920* (Naval Institute Press, 1988)

Futrell, Robert Frank, *The United States Air Force in Korea, 1950–1953* (Duell, Sloan & Pearce, 1961)

Gross, Charles, *The Air National Guard and the American Military Tradition* (National Guard Bureau, 1995)

Hagedorn, Dan and Hellström, Leif, *Foreign Invaders – The Douglas Invader in Foreign Military and US Clandestine Service* (Midland Publishing, 1994)

Heinemann, Edward H. and Rausa, Rosario, *Ed Heinemann – Combat Aircraft Designer* (Naval Institute Press, 1980)

Hunter, Eileen, *El Segundo: Seventy-five Years* (H2 Limited, 1991)

Johnsen, Frederick A., *Douglas A-26 Invader* (Specialty Press, 1999)

Kendziora, Dave, *History of Hill AFB* (History Office, Hill AFB, 1988)

Knaack, Marcelle Size, *Encyclopedia of US Air Force Aircraft and Missile Systems*, Vol. II, *Post-World War II Bombers 1945–1973* (Office of Air Force History, 1988)

Mesko, Jim, *A-26 Invader in Action* (Squadron Signal, 1993)

Nalty, Bernard (ed.), *Winged Shield, Winged Sword: A History of the United States Air Force*, Vol. 1 (Air Force History and Museums Program, 1997)

Rust, Kenn C., *The 9th Air Force in World War II* (Aero Publishers, 1967)

Thompson, Warren, *B-26 Invader Units over Korea* (Osprey Publishing, 2000)

Veronico, Nicholas A., Grantham, A. Kevin and Thompson, Scott A., *Military Aircraft Boneyards* (Motorbooks International, 2000)

Young, Barnett B. 'Skip' (ed.), *The Story of the Crusaders: The 386th Bomb Group in World War II* (386th Bomb Group Association, 1991)

Periodicals

'B-26 Reconnaissance System Shown', *Aviation Week and Space Technology*, 2 November 1964, p.43

'First B-26K Delivery Planned Next Month', *Aviation Week and Space Technology*, 18 May 1964, pp.96–7

'USAF Contemplating Reactivation of B-26s', *Aviation Week and Space Technology*, 13 April 1964, p.30

Clark, R. Wallace, 'Red Stocking', *FlyPast*, November 1999

Farmer, James H., 'The Making of Always', *Air Classics*, February 1990

Hoffman, David H., 'B-26 Will Simulate Supersonic Transport', *Aviation Week and Space Technology*, 17 September 1962

Jamison, Theodore R., 'Nightmare of the Korean Hills: Douglas B-26 Invader Operations in the Korean War, 1950–1953', *Journal of the American Aviation Historical Society*, Summer 1989, pp.82–93

Taylor, Norm, 'Triple Threat Three-in-One Bomber', *Airpower*, November 1989

Whitney, Dan, 'America's First Jet Engine', *Journal of the American Aviation Historical Society*, Summer 2000, pp.95–103

Studies and Reports

Army Air Forces Statistical Digest (as provided by the Air University, Maxwell AFB, Alabama)

Case History of the A-26 Airplane (Historical Division, Air Technical Service Command, Wright Field, October 1945; from: USAF HRC microfilm reel A2062)

Development of Aircraft Gun Turrets in the AAF 1917–1944 (Air Historical Office, Headquarters, Army Air Forces, Army Air Forces Historical Studies No.54, June 1947; reprinted: Sunflower University Press, Manhattan, Kansas)

United States Air Forces Europe Supply, Storage, and Issue, 08 May 1945 to 01 July 1947 (HQ USAFE, 1 October 1948; from: USAF HRC microfilm reel C5056)

United States Air Forces Europe Scrap and Surplus Property Disposal, 08 May 1945 to 31 December 1948 (HQ USAFE, 1 March 1949; from: USAF HRC microfilm reel C5056)

Trester, Dorothy, *History of the AF Storage and Withdrawal Program 1945–1952* (Historical Division, Office of Information Services, Air Materiel Command, Wright-Patterson AFB, OH, April 1954)

Oral Histories

The Oral Memoir of General John P. Henebry (interviewed by Frank DeLeo, 4 April 1997, Oral History Archive, American Airpower Heritage Museum, Midland, Texas)

The Oral Memoir of William J. Morrisey (interviewed by Margaret Cawood, n.d., Oral History Archive, American Airpower Heritage Museum, Midland, Texas)

Index

AAF Contracts
- AC-17946 19, 21
- AC-21393 20, 25, 31, 35, 46
- AC-34433 32, 35, 45, 46
- AC-5140 40, 44, 45
- AC-5141 42, 44, 46

AAF/USAF Units
- Groups
  - 3rd BG 38, 39, 46, 75, 87–8, 97, 107, 108, 110, 111, 113, 114, 118, 119, 120, 121, 123
- 10th TRG 98
- 12th BG 90
- 17th BG 107, 120, 121
- 19th BG 108
- 41st BG 89, 95
- 47th BG 82, 95, 97, 98
- 66th TRG 98, 101
- 67th TRG 120
- 69th RG 81
- 310th BG 101
- 319th BG 79, 88-89
- 323rd BG 101
- 341st BG 90
- 344th BG 94
- 345th BG 98
- 386th BG 38, 76, 79-80
- 391st BG 80
- 394th BG 94
- 397th BG 94
- 409th BG 42, 79, 82, 94-95
- 410th BG 80–1
- 416th BG 79
- 452nd BG 101, 107, 109, 113, 114, 115, 117, 118, 120
- 461st BG 98
- 492nd BG 90
- 543rd TRG 109, 120

Squadrons
- 1st ACS 138
- 12th TRS 120
- 162nd TRS, 109, 116, 120
- 603rd ACS 145
- 606th ACS 145
- 609th ACS 146

Wings
- 1st ACW 138, 140, 141
- 56th ACW 146

Air races
- Bendix Air Races 147, 149, 150, 162
- Mojave Air Races 162–3
- Reno Air Races 162

Air Tanker Companies
- Aero Atlas 160
- Airspray Ltd. 162
- Aircraft Specialties 161
- Central Valley Aerial 160
- Conair 162
- Donaire 161
- Hillcrest Aviation 160
- Lynch Air Tankers 161–2, 163
- Rosenbalm Aviation 160

Aircraft
- Bell Model 9 10
- Consolidated B-24 20–1
- Douglas A-20 10–12, 20
- Douglas A-26, B-26 Designations of 13, 31-32, 96–7
- Douglas A-26, B-26 special mission prefixes of 46, 98–100
- Douglas A-26, variants of
  - XA-26 13, 15, 17–19, 21–2, 25, 26, 29
  - XA-26A 14, 15, 17–19, 23, 25, 27
  - XA-26B 19, 22–3, 25, 28
  - XA-26C 19, 25, 28
  - A-26D 47–8
  - A-26E 47–8
  - XA-26F 46, 48, 50–2
  - A-26G 48
  - A-26H 48
  - A-26Z 48–50
- Douglas B-26, variants of
  - XB-26F 52
  - UB-26J (JD-1) 104–6
  - B-26K (A-26A) 139–41, 142–3, 145–6
  - RB-26L 138
- Douglas DB-7 10, 11
- Douglas JD-1 104–6
- Douglas P-70 12
- Martin B-26 11, 14, 20
- Martin Model 167 10
- North American NA-40 10
- North American B-25 11
- Northrop A-17 6, 9
- Northrop Delta 6
- Northrop Gamma 6
- Northrop Model 7A 9
- Northrop Model 7B 10
- Northrop P-61 27
- Stearman X-100 10

Aircraft Specifications
- Air Corps XC-219 12
- Air Corps XC-220 13, 14
- Douglas DS-538 13

Douglas DS-538B 22
Douglas DS-538-C 14, 19
Douglas DS-539 19
American Seating Co. 33
ANG Units
102nd BS 102
103rd BS 103
106th BG 102, 103
106th BS 102
108th BS 103
111th BG 102, 103
112th BS 103
114th BS 103
115th BS 103
117th BS 103
118th BG 102
122nd BS 103
126th BG 102, 103, 116, 118
155th TRS 103
168th BS 103
180th BS 103
183rd TRS 103
184th TRS 103
Army Air Forces
Fifth Air Force 35, 37, 38, 75, 76, 79, 95, 108, 111, 113, 116, 117, 118
Seventh Air Force 78, 79
Ninth Air Force 42, 76, 78, 79, 93
Tenth Air Force 78, 79
Twelfth Air Force 78, 79
Far East Air Forces 46, 107–10, 113-117, 120, 123
Arnold, Gen. Henry 34–5, 40, 42, 47, 75

Babb, Charles H. 147–8, 149, 150, 155
Beech Aircraft Corp. 33, 35, 42
Bonansinga, Frank 136

Cable, John 10
Central Valley Aerial 203
Confederate Air Force 166
Connick, Lt. Arden D. 82
Cornell Aeronautical Laboratory 162
Cyrus, Dianna 149–50

Denny, Robert O. 152
Doak, E.R. 9
Donovan, Bob 15
Douglas, Donald 4–5, 9, 10
Douglas-Long Beach plant, construction of 20
Douglas-Tulsa plant, construction of 20–1

Echols, Gen. Oliver P. 34–5
Engines
General Electric I-16 48–9, 50, 51
General Electric J31 48–9, 50, 51
Pratt & Whitney R-1535 10
Pratt & Whitney R-1830 10, 70
Pratt & Whitney R-2800 14, 47, 69–71
Pratt & Whitney R-985 9, 70
Wright R-2600 10, 70

Euroworld 168
Foreign Users
Biafra 130
Brazil 125
Chile 125–6
Colombia 126
Cuba 126 134–5
Dominican Republic 130
El Salvador 130–1
France 126–9
Guatemala 129, 134–5
Honduras 131
Indonesia 131, 133–4
Mexico 131
Nicaragua 132
Peru 129
Portugal 131–2
Saudi Arabia 130
Turkey 130

Garrett Corp. 162
General Electric (turrets) 57–9
Grand Central Aircraft Co. 151, 152–3

Hankey, Lt. Col. Ted 76
Heinemann, Ed 6, 8–9, 10, 13, 14, 15, 19, 26–7, 91
Henebry, Col. John 75
Howard, Benny 22

Keithley, L.A. 152
Kenney, Gen. George 38, 75, 88

L.B. Smith Aircraft Corp. *Tempo* 156–7
Lear, John 162–3
Lewis, Dr. George W. 16
Lockheed Aircraft Services *Super 26* 166

Mantz, Paul 5, 147, 150, 158, 160, 165
McDonnell, Wally 163
Mikesh, Lt. Robert 122–3
Moreland Aircraft 6, 7
Morrisey, William J. 46
Motion Pictures
Always 163, 165
Mutual Defense Assistance Program 124–5

National Advisory Committee for Aeronautics (NACA) 15, 16
Northrop Corp. 6, 8, 9

Odom, William P. 149
On Mark Engineering Co. 139–41, 152–4
Marketeer 153
Marksman 153–4
Operation *Farm Gate* 137–8
Operation *Mill Pond* 135
Operation *Steel Tiger* 136–7, 145–6

Pine, Frank 166
Project *Hold-Off* 115

Pyote Field, Texas 95–6, 116

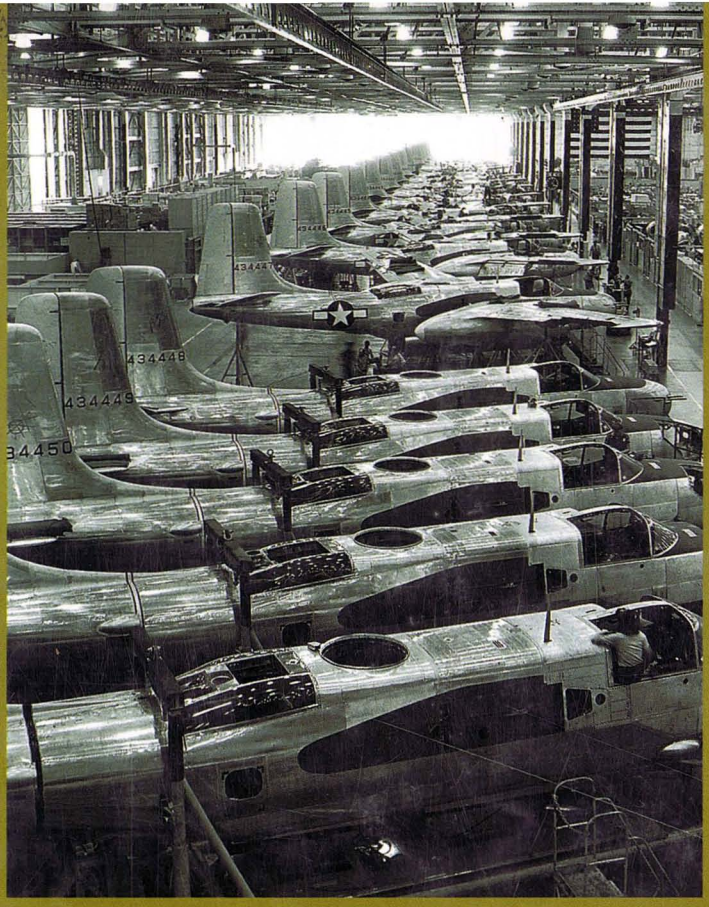
Raymond, Arthur 12
Raytheon 162
Reconstruction Finance Corp. 47, 93, 147
Reconstruction Finance Corp., storage depots
Kingman, 47, 147–8
Walnut Ridge, 148
Retschler, Frederick B. 70
Reyonolds, Milton 149
Rhodes Berry Co. *Silver Sixty* 156
Rock Island Oil *Monarch* 157–8
Rohde, Bob 52
Roser, Alex 150
Royal Air Force 17, 40, 124

Scandinavian Historical Flight 168
Shell Oil Co. 52, 162

Tallman, Frank 165
Tallmantz Aviation 165–6
Texas Railway Equipment Co. 150

U.S. covert operations
Air America 136
Bay of Pigs 134–5
The Congo 142–3
Indonesia 133–4
Laos 135, 142–3, 145, 146
Vietnam 135, 137–9

Walmsley, Capt. John, 118, 119–20
War Assets Administration, 93, 148

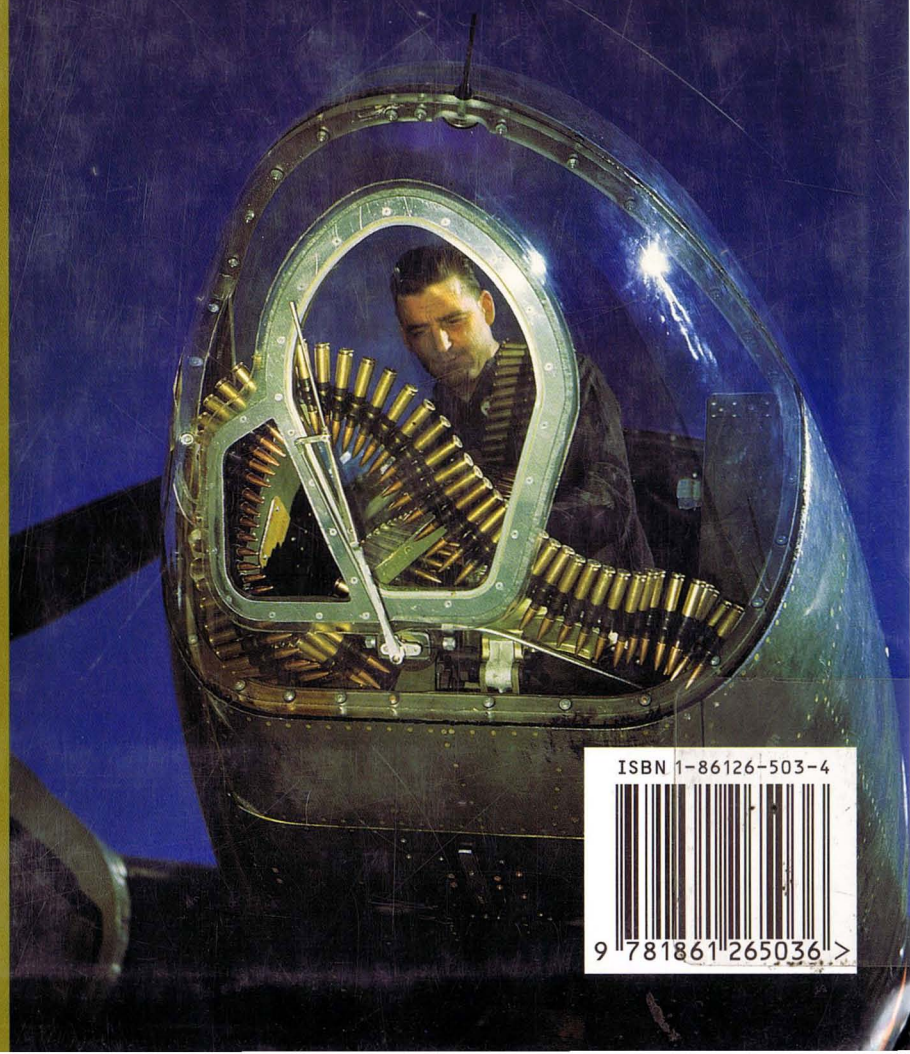






The Douglas A-26/B-26 Invader has often been overshadowed by other aircraft and circumstances. It saw service too late in World War Two to lay claim to a distinctive heritage. By Korea, it was seen as a workhorse and just an old 'propeller job', the spotlight now concentrating on new jet fighters. In the sixties it was covertly operated during the war in South-East Asia and became lost in the ambiguities of that conflict. Even today, the slim fuselage, huge nacelles and graceful lines are not enough to prevent perpetual confusion by many people between the Douglas B-26 Invader and its somewhat portly predecessor, the Martin B-26 Marauder. But there can be no doubt that the Invader was a fine aircraft – good looking, highly effective and popular with its crews.

This volume presents the complete story of the Douglas Invader, from its design and early history through wartime service and peacetime uses. A complete description of the aircraft is included, as are details of each of the many Invader variants. A selection of rare photographs, many never before published, is used to illustrate this history of the oft-forgotten but nonetheless impressive A-26 and B-26 Invader.



ISBN 1-86126-503-4

9 781861 265036